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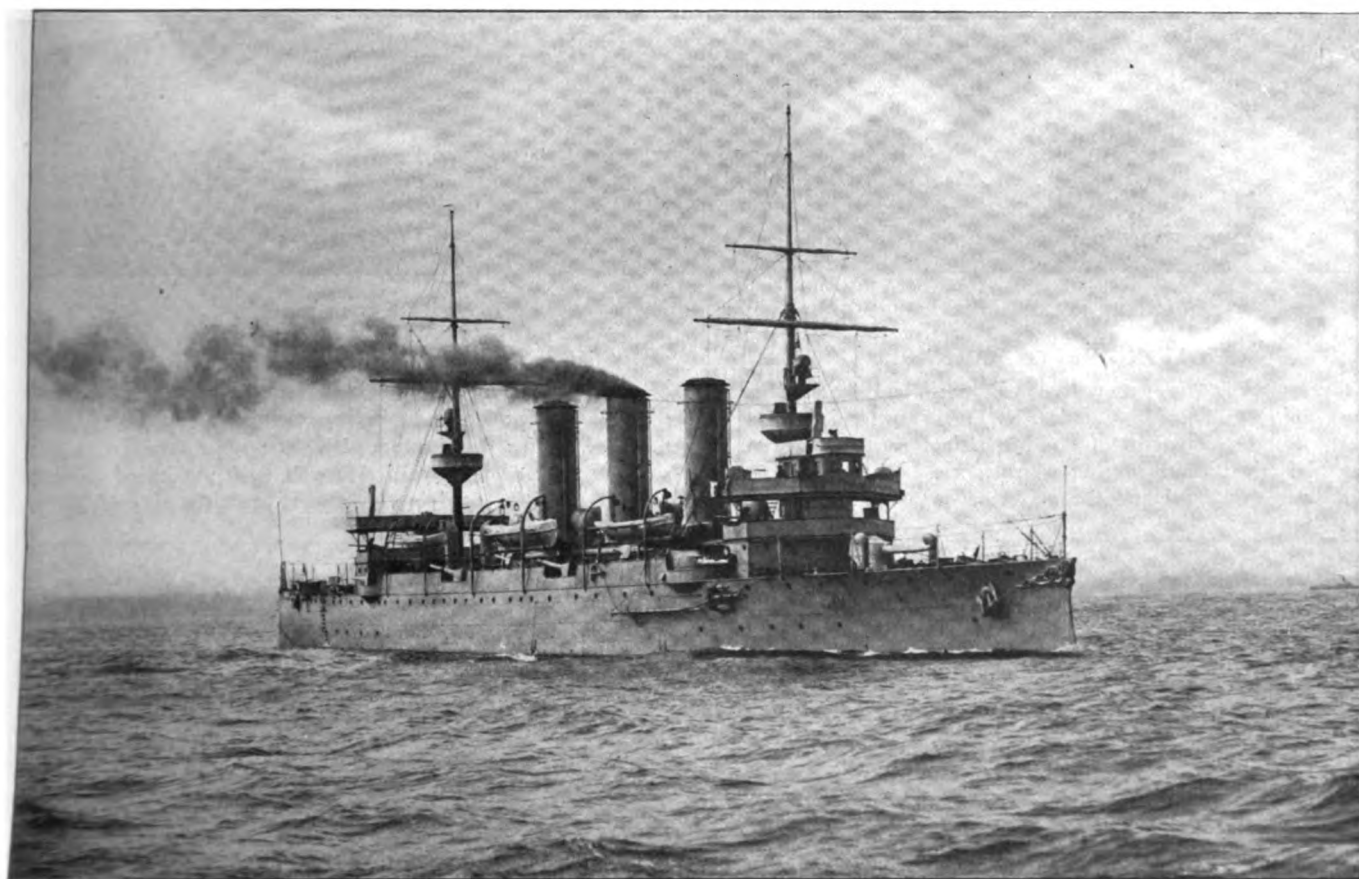
CLEVELAND, O., SEPT. 8, 1904.

No. 10.

TURKISH CRUISER ABDUL HAMID.

Through the courtesy of Sir W. G. Armstrong, Whitworth & Co., the Review is permitted to publish the accompanying photograph of the new protected cruiser Abdul Hamid, which

of the vessel, with a thickness on the flat of $1\frac{1}{2}$ in. and on the slopes of $3\frac{1}{2}$ in. Glacis plates 4 in. thick protect the engine and boiler casings. The cruiser is provided with boilers and machinery of 12,500 I. H. P. and obtained a speed of



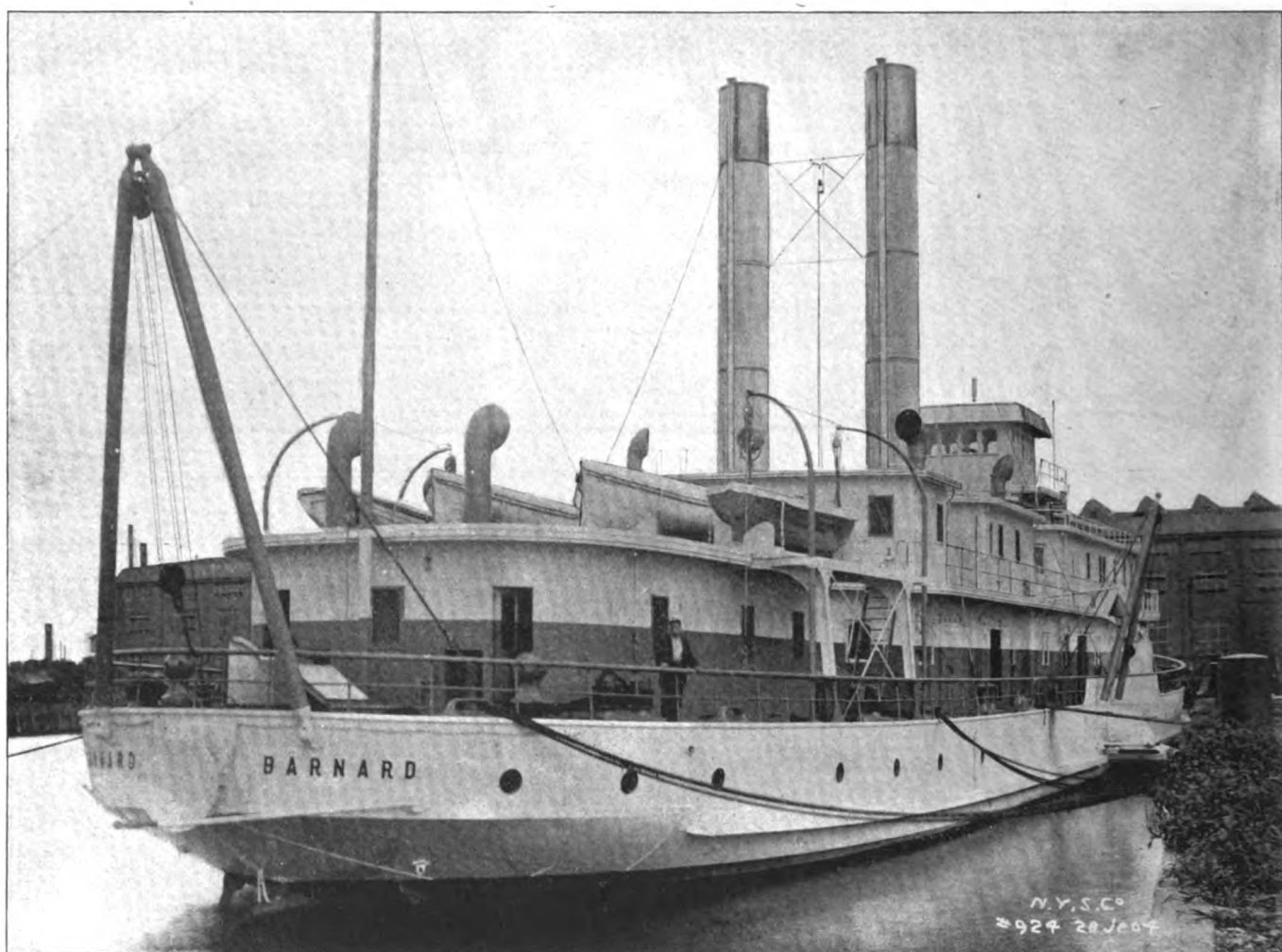
PROTECTED CRUISER ABDUL HAMID FOR THE TURKISH NAVY.

[Built by Sir W. G. Armstrong, Whitworth & Co., Elswick, England.]

is just being completed at their Elswick ship yard for the Sultan of Turkey. The Hamid's principal dimensions are: Length, 340 ft.; breadth, 47 ft. 6 in.; draught, 16 ft.; displacement, 3,800 tons. Her armament consists of two 6-in. quick-firing guns, eight 4.7-in. quick-firing guns; six 3-pounder quick-firing guns; six 1-pounder quick-firing guns and two torpedo tubes. A protective deck extends the whole length

22.25 knots on her forced draft trial. Her full coal supply is 731 tons and she carries a complement of 360 officers and men.

The Hoquiam ship yard, Hoquiam, Wash., has been given a contract by the United Engineering Works of Oakland, Cal., for a steamer 85 ft. long, 27 ft. wide and $9\frac{1}{2}$ ft. deep. She is intended for towing.

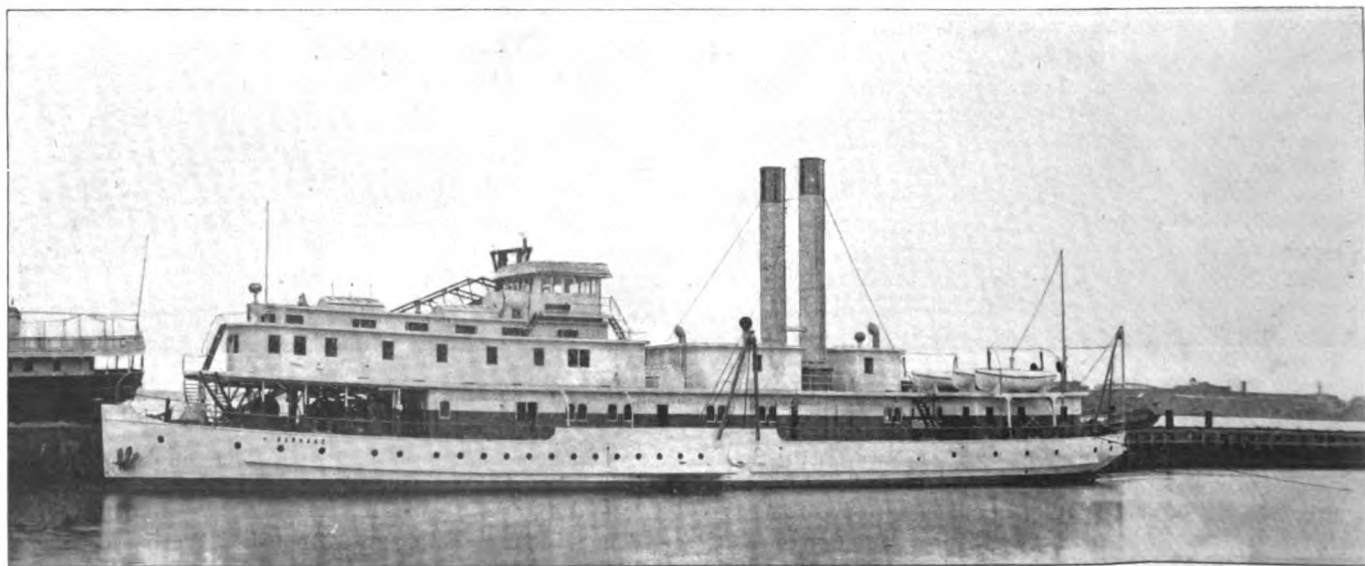


UNITED STATES GOVERNMENT DREDGE BARNARD FOR SERVICE IN THE SOUTHWEST PASS.

SUCTION DREDGE BARNARD.

The United States suction dredge Barnard, built by the New York Ship Building Co., Camden, N. J., for government work in the Southwest passes of the Mississippi river, underwent her trial trip recently during which a speed of 12 miles per hour was developed and the performance of her machinery

was satisfactory in every particular. The hull is built entirely of steel and is of the following general dimensions: Length over all, 210 ft.; length between perpendiculars, 198 ft.; beam moulded, 38 ft.; depth moulded, 14 ft.; sheer forward, 4 ft.; sheer aft, 2 ft.; length of suction well, 60 ft.; width of suction well, 7 ft. The dredging machinery consists of one 36-in.



UNITED STATES GOVERNMENT DREDGE BARNARD.

centrifugal dredging pump direct connected to a three-crank, triple-expansion engine, cylinders 21, 32 and 54 in. diameter by 26 in. stroke. With 160 lb. of steam the engine turned the pump 122 revolutions per minute at the trial, developing 998 I. H. P. divided as follows: High-pressure cylinder, 338; intermediate-pressure cylinder, 329; low-pressure cylinder, 331; vacuum, 22¾ in.; mean referred pressure, 27.3 lb. The engine is fitted with piston valves throughout and the speed regulation is by means of a throttling governor. The pump is of the balanced double suction type made after the designs of Capt. Mason N. Patrick.

The propelling machinery consists of two sets of triple-ex-

sents, until some unusual incident such as the one reported in the Herald brings it to their notice. One charge of gas is sufficient to keep these buoys burning continuously from six months to one year, according to the size of the body. That fact explains the "commendable pertinacity" with which this buoy continued to perform its function while crossing the Atlantic. The article is as follows:

"Silently following the transatlantic steamship lanes from Cape Race to the English channel there has been drifting for the last month a mysterious sentinel in the shape of a gas buoy, which, although far removed from the danger which it originally served to mark, continues to function with com-



HALL BROS' SHIP YARD AT PORT BLAKELY, WASH.,

pansion engines, driving twin screws. The engines have cylinders 12, 18 and 30 in. diameters by 18-in. stroke, allowed 170 lb. of steam and turning 201 revolutions per minute. The engines developed 453 I. H. P. each divided as follows: High-pressure cylinder, 148; intermediate pressure cylinder, 171; low pressure cylinder, 134; vacuum, 25 in.; mean referred pressure, 35.25 lb. As will be noted from the photograph the dredge resembles the Mississippi type of steamer very much.

HALL BROS' SHIP YARD.

The ship yard of Hall Bros. lies at Port Blakely, Wash., nine miles from Seattle on the northern shore of Eagle Harbor and during the thirty years of its existence has constructed over 115 vessels. Of course the work is exclusively wooden and their specialty is schooner building. Their first vessel was the Annie G. of 125 tons burden. During later years they built a number of five-masted schooners, the largest of which is the five-master George E. Billings with a dead-weight carrying capacity of 2,400 tons. The equipment also includes a modern marine railway capable of handling a 4,000-ton vessel. The railway is 740 ft. long and has a steel cradle.

RELIABILITY OF A GAS LIGHTED BUOY.

The subjoined news item appeared in the New York Sunday Herald of Aug. 28. The traveling buoy told about was without doubt one of the Pintsch gas lighted buoys with flashing apparatus. It probably had been moored off the coast of Maine, or possibly in Canadian waters. Mariners of course know of the dependable characteristics of this type of marine beacon, but probably few travelers know how great an improvement in the field of aids to navigation this buoy repre-

sents. First Officer Owen of the steamship Tampican, who sighted the buoy on July 24, while bound from Hamburg to Quebec, states that on that date, in latitude 47 deg. 24 min. north, longitude 43 deg. 56 min. west, his vessel bore down upon a gas buoy bearing a staff and cage, and with a dark blue flag flying; also two occulting lights brightly burning. The steamship East Point, Capt. Beavis, bound from Philadelphia to London, reports having sighted the buoy, still burning, on Aug. 5, its position being some 60 miles to the eastward of that given by the Tampican. In the description furnished by Capt. Beavis he states that the buoy bore on either side the number '38,' painted in large white characters."

STEAMSHIP ALASKAN TO USE OIL FUEL.

The American-Hawaiian Steamship Co. of New York advises the Review that they intend to equip the steamship Alaskan to use oil fuel in place of coal in the near future. The company adds in a general way: "We can say that our experience with fuel oil has been favorable, but owing to the long voyages which our ships make and other causes it is not possible at this date to make any definite comparisons as to the permanent results obtained by the use of fuel oil in the place of coal."

Bruce Ismay and Sir Clinton Dawkins, representing the International Mercantile Marine Co., have gone to Frankfort, Germany, to confer with Lord Inverclyde, chairman of the Cunard Line, and Herr Ballin, director general of the Hamburg-American Line, with a view to ending the present passenger rate war in the Atlantic trade.

GALVESTON AS A SEAPORT.

By C. R. KITCHELL,
Secretary Galveston Chamber of Commerce.



The city of Galveston today affords the most convenient, practical and substantial harbor with most abundant facilities for shipping of anywhere along the Gulf coast. Tributary to this very accessible ocean gateway, the affluent resources of the transcendent region of our country extending from north to south-westward of the Mississippi valley, and incoming commerce to the same territory, supplying the various necessities and luxuries of a growing and prosperous population, find suitable and commodious transportation through this port. The enormous product of cotton

in Texas and Oklahoma, the increasing rice plantations, the lumber regions, the oil fields and the grain lands of Texas, contribute ever present and multiplying quantities of goods to engage the attention of a coastwise trade. The wealth of the grain fields of Kansas and Nebraska, the mines of the Western states, the great product of the Pacific slope have distribution through this channel.

Galveston has just finished her great seawall of fortification against invading waters which, with accompanying grade raising, firmly establishes this harbor as a safe one through which all trade may be handled without danger. This seawall is composed of crushed granite and cement, well mixed, and formed into one solid rock of wall 17 ft. high above mean low tide—16 ft. wide at the base, curving in on the gulf side to 5 ft. in width at the top. It is firmly founded on piling driven 40 ft. to clay, with an extra row of sheet piling along the front and a rip-rap of huge granite boulders in front. The structure is indestructible and will serve indefinitely as an absolute protection from any damage by the seas. This most remarkable undertaking by the citizens of Galveston in restoring confi-

dence by building the seawall and in raising the city's grade, costing \$3,500,000, is a splendid evidence of their energy and resource. The future is now very bright for this city in all directions. Shipping is steadily growing. Galveston is now first port in shipments of cotton and wheat and ranks a very close third in total volume of foreign exports in the United States.

The coastwise trade of Galveston is of great importance. Fine new freight and passenger steamers of the Mallory Line (New York & Texas Steamship Co.) and the fast freighters of the Morgan Line (Southern Pacific Co.) are carrying an enormous aggregate of augmenting tonnage both from and to this port. The great fleet of freighters of the Southern Pacific Co. was transferred from New Orleans to Galveston something over a year ago and the promise of an enormous increase of traffic is being fulfilled. The Morgan Line ships ply between New York and Galveston.

The Mallory Line fleet consists of eleven iron and steel steamships of total tonnage of 40,700 tons. The latter also maintains a service between Galveston and Key West. These lines have regular sailings from Galveston five to seven times a week, depending upon the seasons. Practically all kinds of the varied products of the south and west are handled this way. Quick time and first class service have proven to shippers that freight, both to and from Atlantic seaboard territory, can be handled via Galveston to as good, and in many cases better, advantage than via all rail routes.

The Mallory Line recently constructed at Galveston steamship docks as well equipped and complete as any on the Atlantic or Gulf coast. Their warehouse here is over 1,270 ft. long and 300 ft. wide, completely enclosed, and has the latest electrical and steam machinery for the quick handling of all freight.

The Morgan Line pier at Galveston is the largest in the world. The permanence of deep water at this port and the

magnificence of the harbor warranted the Southern Pacific Co. in spending millions of dollars in terminals at Galveston. Their warehouses and docks are splendid, with the best and latest mechanical methods for caring for all freight. Sixteen large steamers can be doubled at their docks with ample room in the berths, and over 400 cars can be loaded



PARTIAL VIEW OF THE SPLENDID DOCKS OF THE MALLORY LINE AT GALVESTON;
1,270 FT. LONG AND 300 FT. WIDE.

or unloaded at the same time. Thousands of men are employed along the wharves of Galveston.

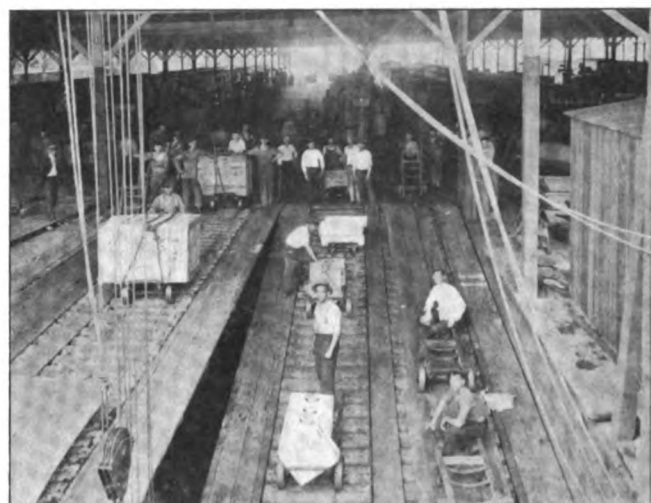
With other coastwise trade Galveston is served in Brownsville, Texas, and surrounding territory commerce, by the Galveston & Gulf Steamship Line through the medium of an At steamer of light draught over 400 tons burden, especially adapted to coastwise service. This has given regular sailings for over two years. Lately conditions have called for an extension of her trips between Galveston and New Orleans and



VIEWS OF THE GREAT GALVESTON SEA WALL, CONSTRUCTED SINCE THE FLOOD.



VESSELS IN THE HARBOR OF GALVESTON.



THE SOUTHERN PACIFIC, MORGAN LINE, DOCKS AT GALVESTON.

between Galveston and Point Isabel on the Texas coast, the port of entrance for Brownsville.

Schooners and barges of various number and descriptions operate between Galveston and points on the Texas and Louisiana coasts, and there are frequent schooners between this port and North Atlantic ports.

The records show coastwise tonnage from and to Galveston for the year 1903 was never before equaled here. The following table indicates the steady increase:

Years.	Entered.		Cleared.	
	No.	Tons.	No.	Tons.
1900.....	182	278,831	209	295,065
1901.....	280	490,465	214	358,804
1902.....	313	705,502	267	504,844
1903.....	472	1,083,100	385	798,279

During the last fiscal year the value of coastwise traffic in this port exceeded by over \$60,000,000 the value of the previous year, the total value for the last fiscal year in coastwise trade through Galveston being over \$400,000,000.

A STEAMER MAGNETISED IN MID OCEAN.

The American Line steamer Westmoreland, from Philadelphia, which arrived at Queenstown recently, brings intelligence of a strange phenomenon experienced by the British ship *Mohican* in the Atlantic whilst on a voyage to Philadelphia. A cloud of phosphoric appearance enveloped the vessel, magnetising everything on board. Captain Urquhart says the vessel

and crew had a fiery coating. When the sailors saw it they looked at the needle, and it was moving like an electric fan. He ordered several of the crew to move some iron chains lying on the deck; the sailors could not remove them, although they did not weigh more than 75 lbs. each; everything was magnetised, and chains, bolts, spikes and bars adhered to the decks as if they had been riveted. The cloud was so dense that it was impossible for the vessel to proceed. He could not see beyond the decks, and everything appeared a mass of glowing fire. Suddenly the cloud lifted, the phosphorescence on the ship began to fade, and in a few minutes the cloud passed away and could be seen moving over the sea.

The pleasure boat *Happy Day*, built by the Crescent ship yard, Elizabethport, N. J., for Charles M. Schwab, underwent her trial trip on the Hudson river last week with most satisfactory results. Her speed exceeded 16 knots an hour. The vessel is intended to be chiefly used for giving outings during the summer for poor children of New York.

The Fulton Iron Works, San Francisco, Cal., have since they begun business as ship and engine boiler builders constructed either the hull or the engines and boilers of over 200 steamers. The North Pacific Coast Railroad Co.'s ferry and passenger steamer *Sausalito* is probably the most pretentious vessel which this company has constructed.

EXTRAORDINARY METHOD OF STOPPING A LEAK.

The Norwegian barque *Flora*, 486 tons, sailed on Jan. 5 from Norway for Cape Town with a cargo of wood goods. As she reached the Bay of Biscay she experienced fearful weather, so that she had to lie to for six days, part of the time under lower topsail and the remainder under bare poles. During this storm the vessel sprang a leak on the port side forward. The leakage was so heavy that the ship made six inches of water per hour. The pumps were kept constantly going, but as she came farther south she got smoother water. There was a windmill rigged, which gave the crew a welcome respite from the hard pumping, but there was other and hard work to carry out, and it was feared that the leakage would increase. In the meantime the master (Capt. Matson) warded off the danger in a manner which has filled all seamen who have heard it with astonishment and wonder. He prepared a long bag of good canvas. It was about 16 ft. long, 6 ft. in circumference, and 2 ft. diameter, and had much the same appearance as a windsail employed to get air down the hold aboard ship. About 5 ft. from the bag's bottom the captain cut a hole, and set in a glass (a looking-glass from which the quicksilver had been scraped) in a wooden frame. A little below this on each side he cut two smaller holes, to which he sewed arms of watertight material. A little below again he placed a ring of galvanized iron to keep the bag spread, and somewhat above he fastened another ring in a similar manner. Meantime there was a tackle rigged under the keel, and a rope was made fast to the bottom of the bag so that it could be sunk down over the leak. When all was ready the captain went into the sack. He stood on his feet on the bottom, while the lower ring was at his breast; the arms were put into the watertight sleeves, which were bound tight over his wrists; and his face was at the little window. In his hands he had tools and materials for tightening the leak, and he ordered the crew to set out the sack, which after being put over the rail was lowered down until the captain was right opposite the leak, which was about 3 ft. under water. The bag was now held open by the help of the above hoop iron rings, and the opening was level with the rail, so that the captain and crew could see and hear each other. Capt. Matson found that a seam had opened, and he tried first and foremost to close the hole with rope, but it proved impossible, as the rope was washed away before he could get it fastened. He then set a piece of cloth in the opening, and nailed a rope outside. This stopped the leak, so that the ship for the rest of the voyage made one inch instead of six inches of water per hour. While this difficult work of tightening was carried out the ship rolled so heavily that the captain was at times seven feet under the surface of the water. It took naturally some time to carry out the work, and the bottom of the sack became at last so chafed by the captain's feet that the water pressed in and mounted right up to his throat, on which he gave the signal to be hoisted up. After the sack's bottom was repaired, he went down again and finished the work. When the *Flora* had arrived in Table Bay Capt. Matson went down again and closed the leak.

Capt. Benjamin L. Cowles, Buffalo, on Aug. 24 bought the plant of the Erie Basin Ship Building Co., which recently went into bankruptcy. Capt. Cowles has organized a new company and will operate the plant which is located at the foot of Genesee street, Buffalo. The well-known boat builder, W. J. Hingston, will play an important part in the new company and will build as its first vessel a steel tug 55 ft. long for T. E. Cowles, father of B. L. Cowles. It will be similar to the *Erastus C. Knight*, which Mr. Cowles, Sr., recently sold to Seneca lake parties.

SHIP BUILDING IN THE UNITED KINGDOM.

From the returns compiled by Lloyds Register of Shipping it appears that excepting warships there were 392 vessels of 903,088 tons gross under construction in the United Kingdom at the close of the quarter ended June 30, 1904. The particulars of the vessels are as follows, similar details being given for the corresponding period in 1903 for the purpose of comparison:

DESCRIPTION.	30th June, 1904.		30th June, 1903.	
	No.	Gross Tonnage.	No.	Gross Tonnage.
STEAM.				
Steel.....	355	982,644	397	1,020,381
Iron.....	4	704	2	390
Wood and Composite.....	2	810	2	270
Total.....	361	983,658	401	1,021,011
SAIL.				
Steel.....	15	7,730	10	5,520
Iron.....	16	1,700	15	1,568
Wood and Composite.....	31	9,430	25	7,088
Total.....	32	993,088	426	1,028,069
Total Steam and Sail...	392	993,088	426	1,028,069

The tonnage under construction is now about 45 tons more than it was at the end of March, 1904. Compared, however, with the total reached in September, 1901, which is the highest on record, the present figures show a reduction of 420,000 tons or about 30 per cent. Of the vessels under construction in the United Kingdom at the end of June, 313 of 750,982 tons are under the supervision of the surveyors of Lloyds register with a view to classification by that society. In addition fifty-nine vessels of 150,862 tons are building abroad with a view to classification. The total building at the present time under the supervision of Lloyd's is 372 vessels of 901,844 tons.

The control of ocean meteorology through wireless telegraphy has been transferred from the hydrographic office to the weather bureau. In commenting on the transfer Prof. Willis Moore, chief of the weather bureau, said the result would be an uninterrupted wireless communication with all classes of vessels whether merchant marine or battleship when within 300 miles of either the Pacific or Atlantic coast. It is the present purpose of the government to establish at least fifty stations on the Atlantic and Pacific coasts. By this means it is expected that advance news of storms at sea may be procured some hours earlier than is at present possible.

A board of naval engineering experts from Washington has just completed a thorough examination of the *Turbinia* belonging to the Turbine Steamship Co. of Hamilton, Ont., and operating on the route between Hamilton and Toronto. The board regards the performance of the *Turbinia* as highly satisfactory. There was a complete absence of vibration; almost no repairs are necessary to the engines, there being no friction whatever, except in a few bearings; there is no pounding or thumping of the engines; the engine room staff is largely reduced and additional coal carrying capacity is gained by the reduction in the weight of the engines.

Secretary Morton has ordered a suspension of the work of enlarging the power plant at the New York navy yard and directed that the plant be connected with that of the bureau of yards and docks. This action has an important bearing on the general question of the consolidation of power plant at all navy yards under the control of the bureau of yards and docks, a plan proposed by Rear Admiral Endicott, chief of that bureau, but disapproved of by the bureau of construction.

THE LINE TO NANTUCKET.



The New Bedford, Marthas Vineyard & Nantucket Steamboat Co., as at present organized, dates from 1886 the company having been formed in that year by the consolidation of the old New Bedford, Vineyard & Nantucket Steamboat Co. with the Nantucket & Cape Cod Steamboat Co. The first named of the old companies was originally formed to operate steamers between New Bedford, Vineyard Haven and Edgartown only and, through its several predecessors, dates from about 1845. The last mentioned of the old companies was chartered in 1855 to run steamers between Nantucket and Hyannis, Mass. The two old companies gradually

encroached upon each other's territory until in the late 70's and early 80's the two lines were directly competing on the route between New Bedford, Woods Hole, Vineyard Haven, Cottage City, Edgartown and Nantucket.

A consolidation was arranged late in 1885 and the present company began its corporate existence in March, 1886, with the following fleet of wooden side-wheel steamboats, viz: River Queen, Island Home,

Marthas Vineyard and Monohansett. Late in the summer the handsome new steamer Nantucket was added to the fleet and placed on the New Bedford-Nantucket run.

In 1891, the business having considerably increased, the fine steamer Gay Head was built for the route and a year or two later the River Queen was sold to parties in Washington, D. C., where she is still in service. In 1895 the Island Home was disposed of and the new owners converted her into a coal barge.

In the fall of 1901 a new steel hull side-wheel steamer, the Uncatena, was contracted for and she replaced the Monohansett on the New Bedford-Edgartown run in the fall of 1902.

In June, 1903, the Monohansett was sold to Boston parties and she was recently lost on Misery Island, near Salem, Mass., having run ashore in a fog.

By reason of the tidal conditions on Nantucket bar the draught of steamers operating on this route must not exceed 7 ft. while ability to run throughout the year in the rough waters of Vineyard Sound and down across Nantucket Shoals demands very staunch construction and careful choice of model to secure comfortable sea-going qualities. So far the company has confined itself to side-wheel steamers for the service and no better examples of this type can be found

anywhere. The rapid development of the marine steam turbine bids fair to offer a different and much better type of steamer for service on this route and the result of the present turbine installations is being most carefully watched by the present management.

No sketch of this company, however short, would be complete without some tribute to the memory of the late Andrew G. Pierce, president of the company from 1886 to his death in 1903 and identified with the various steamboat lines, which finally merged into this company, since 1854. To his personal efforts in positions of responsibility and to the implicit trust placed in him by his associates and the traveling public is due the high standing enjoyed by this company today.

During his lifetime the business grew from the small beginnings in 1854 until the present company is handling yearly in excess of a quarter million passengers and freight valued at over three-quarters of a million dollars. The company now operates the four steamers Uncatena, Gay Head, Nantucket and Marthas Vineyard between the ports of New Bedford, Woods Hole, Vineyard Haven, Cottage City, Edgartown and Nantucket with occasional excursion trips to Gay Head, Falmouth, Hyannis or Newport. The line is the only route to the summer resorts on the two islands of Marthas Vineyard and Nantucket and, through its rail connections, draws a large patronage from all the New England States as well as New York, Pennsylvania, New Jersey, Delaware, Maryland and many other states besides.

The following is believed to be a correct list of all steamers that have run regularly on the route now operated by this

company: Marco Bozzaris, Telegraph, Massachusetts, George Law, Naushon—1845, Eagles Wing—1856, Metacomet, Canonicus, Island Home—1855, Monohansett—1861, Helen Augusta—purchased 1863, Marthas Vineyard—1871, River Queen—1861, Nantucket—1886, Gay Head—1891, Uncatena—1902.



THE NANTUCKET FERRY UNCATENA.

The Canadian government, by an order adopted in council at Ottawa, will enter into an agreement for

the installation of thirty bells in the St. Lawrence river and off the coast of the maritime provinces. Of the stations which are to be installed twenty-six are to be operated from shore and four from lightships. It is expected that all ships making Canadian ports will be equipped with telephonic apparatus for picking up the sounds of the bells. This system of marine signaling has been quite thoroughly investigated by the United States navy department and by the lighthouse board and has been generally endorsed. Although the system has not been adopted in the United States before it has been installed however experimentally for some months at Boston lightship, Pollock Rip Shoals lightship and Vineyard Sound lightship and the signals have easily been picked up by the ships of the Metropolitan Line, which are equipped with the receiving apparatus. The Submarine Signaling Co., of which Mr. Henry M. Whitney is president, has recently asked permission of the lighthouse board to install one of its bells for experimental purposes on the following lightships: Nantucket Shoals, Fire Island, Sandy Hook, Overfalls, Brenton's Reef, Confield and Portland.

Tarr & James, Essex, Mass., have just received orders for three schooners.

A FORCEFUL ADDRESS.

An address of great power and conviction was made before the Merchant Marine Commission at its Philadelphia hearing by Mr. Alba B. Johnson of the Baldwin Locomotive Works. Probably no single address before the commission has been more convincing than that of Mr. Johnson's, because he appeared not as a builder of ships nor as a ship owner directly interested in establishing a profitable business, but as a manufacturer whose business has been originated and built up through the wise application of protective principles. He very clearly pointed out to the commission that the multiplication of American ships means the multiplication of American houses in foreign ports interested in promoting American trade. It would mean the extension of American banking and finance in countries now controlled exclusively by foreign capital. It would also mean an ample supply of American vessels available as transports in case of war. Continuing, Mr. Johnson said:

"Our great industries have been built up by a protective tariff, and have now become so strong that in many fields we are able to find an entrance to foreign markets. In denying the right of United States registry to foreign-built ships, we have extended the protection of our laws to our ship builders. The operation of these laws affords not merely protection, but absolute prohibition of any foreign competition. By our navigation laws we have given to American sailors protection greater than any enjoyed by his fellow-workmen on shore. The American ship owner engaged in foreign commerce has, however, received no protection, but has been left exposed to an unlimited destructive competition. His only refuge from bankruptcy has been to confine his ships to coastwise commerce of the United States, and to build no more than can find profitable employment in that limited field.

"The ship builder naturally desires to maintain the protection of the present laws, because they afford the maximum protection possible. The ship owner may desire free ships so that he can buy ships in the cheapest market. He may also desire the relaxation of our navigation laws, to enable him to operate them upon as favorable a basis as the ships of competitive nations. We want our ship builders to have a monopoly of building our new merchant marine. We want our sailors to be the best paid, as well as the best treated, of any in the world. We are not prepared to deprive any industry of the protection necessary for its existence, and the problem which we are called upon to solve, is how to provide the protection essential to the prosperity of all three classes. The additional cost of building ships in American ship yards, and operating them under American navigation

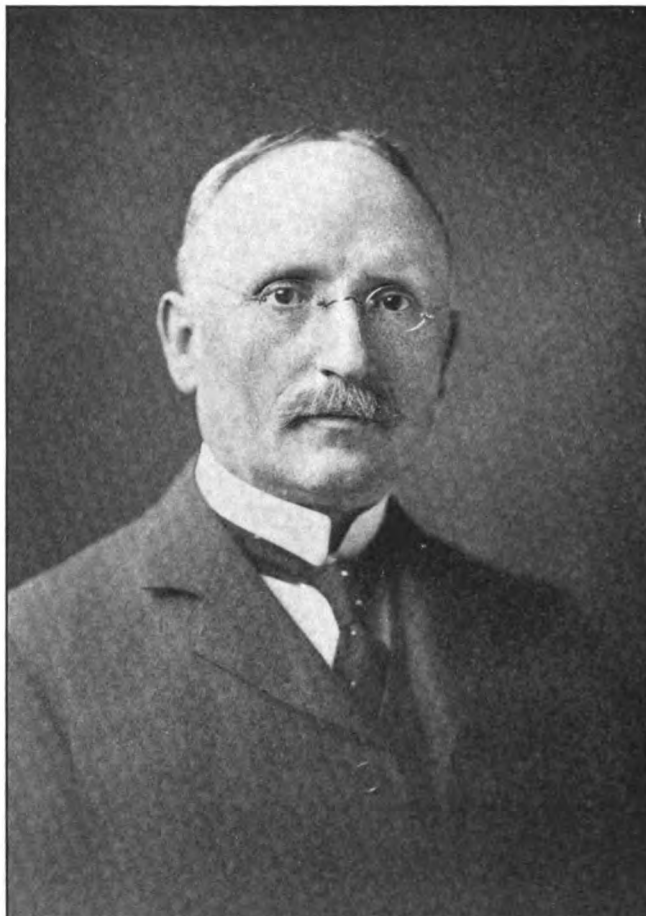
laws, are real obstacles to the revival of American commerce, which must be removed before our flag ceases to be a curiosity in the ports of the world.

"We need most of all a fleet of tramp steamers, such as are built in England on £1 shares, and are chartered to carry freights to every port in the world. If our cargoes are carried in American bottoms, our mails will not be carried under foreign flags.

"I believe that our people, as a nation, are sincerely desirous of removing the obstacles to the revival of our shipping, if they can be satisfied as to what is the proper method of arriving at this result. The most direct method is by subsidy. Our people are, however, reluctant to approve of subsidy legislation, fearing that it will be absurd for the undue advantage of particular interests. They are also uncertain as to the amount of subsidy necessary to equalize the difference of conditions, without pauperizing the interests affected. For these reasons, every subsidy measure introduced into congress has been bitterly contested, and its defeat or postponement has been accepted with more or less approval by the country at large. Whilst it is necessary for us to offer subsidies for a limited number of years for the purpose of stimulating the construction of American ships, I believe that they should be adopted in moderation, and I am also of the opinion that the subsidy principle should not be adopted as the sole method of encouraging the revival of our shipping. I would advocate, first, ample

compensation for carrying the mails to foreign countries in ships bearing the United States flag, the rates being graded according to the speed; second, a moderate tonnage, bounty, or subsidy, payable only upon the outward voyage, but sufficient to make profitable the carrying of cargoes of all classes in line and tramp steamers of American register; third, I would promote importations in American ships by enacting a general law allowing a sufficient reduction of duties to create a preference for shipments of homeward-bound goods in American vessels. For instance, a reduction of 10 per cent of duties might be established for imports in American sailing ships, and a reduction of 15 per cent if in American steamers. I believe that this would be sufficient to cause American importers to insist upon a preference being given to American ships by foreign shippers, and create a demand for American charters, both outbound and inbound, which does not now exist.

"We have come to a point in our industrial development, where the belief is widespread that certain industries receive greater protection than is necessary to equalize the difference of industrial conditions at home and abroad. That this belief is justified, is evidenced by the willingness of some manufacturers to quote lower prices for export than for domestic



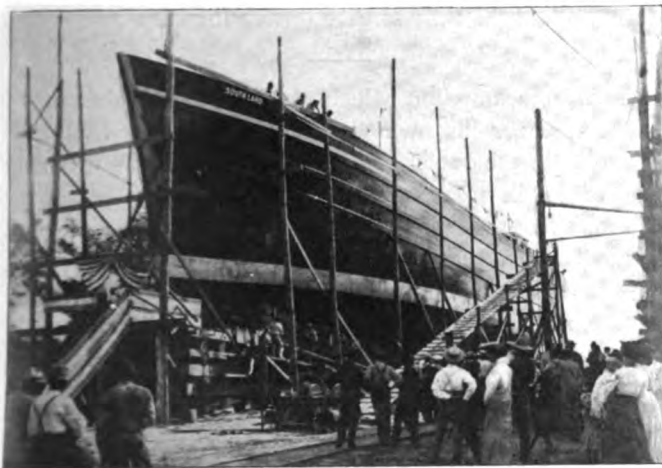
MR. ALBA B. JOHNSON.

sales. The time has come when some reduction of our tariff restrictions may be made for the purpose of promoting our reciprocal exchange of goods with foreign nations, and in insuring that a fair part of this exchange shall be made in American ships. During the past forty years we have built up and maintained a tariff wall for the protection of our industries, and they have grown strong and prosperous, until many are equal to competition to any in the world in their particular lines.

"President McKinley's last speech at Buffalo, in favor of reciprocity treaties struck the key note of this belief, and I believe that were this great apostle of protection still amongst us, he would advocate this use of our existing but unnecessarily protective tariff, for the purpose of accomplishing the revival of American shipping, which is desired by the whole nation, and the extension of the protective principle to the American ship owner who hitherto has alone stood unprotected."

SOUTHERN SHIP BUILDING CO.'S FIRST SHIP.

On Thursday morning, Aug. 25, the Southern Ship Building Co. of Jacksonville, Fla., launched their first ship. She is a lumber barge for the Cook-Cummer Steamship Line of Philadelphia and is expected to carry 600,000 ft. of yellow pine



LAUNCH OF THE SOUTHLAND.

lumber or 1,200 tons of coal on a draught of 15 ft. 6 in. Her dimensions are as follows: Length over all 191 ft. 2 in., beam outside plank 35 ft., depth of hold 18 ft. At exactly 7:52 A. M. Mr. John A. Ryan, the superintendent of the yard, gave the order to the men to set up, and in just twenty-two minutes the vessel was in the water.

The ship was christened the Southland by Miss Mabel Cummer of Jacksonville. This is the largest ship ever built in the south and notwithstanding the early hour there was quite a large crowd of people to witness the launch. This yard has only been in existence since the first of the year, but owing to the use of up-to-date tools and machinery and the ability of a large force of first-class mechanics, they have made remarkable progress. They now have on the stocks two other ships which are duplicates of the Southland. One of these will be launched in about a month from now. These vessels are all built entirely of yellow pine with the exception of hackmatack and spruce knees, and are through fastened with galvanized iron and locust treenails. They will be used in carrying lumber from Jacksonville to Northern ports, and will be towed by the new steel tug Wellington, which has just been built by the Burlee Dry Dock Co., Staten Island, for the Cook-Cummer Steamship Line.

TUG PAUL JONES.

The tug Paul Jones, built at New London, Conn., from designs by John Forsyth of Mystic, Conn., for the Thames Tow Boat Co. is one of the most powerful tugs in coast service. She is 190 ft. over all, 170 ft. on the low water line, 38 ft. beam and 20 ft. 6 in. deep, with a mean draught of 16 ft. 5 in. Her hull is unusually staunch, the keel being of white oak, the frame of Connecticut oak and hackmatack and the ceiling and deck of the best Georgia pine. The outside planking is of white oak from 4 to 8 in. thick. The motive power consists of a vertical inverted triple-expansion engine with cylinders 21, 31 and 55 in. diameter by 36 in. stroke, intended to develop 1,600 H. P. Steam is furnished by two boilers, 14



TUG PAUL JONES OF THE THAMES TOWBOAT CO.'S FLEET.

ft. 3 in. diameter by 12 ft. long, fitted with three corrugated furnaces to each boiler. Both engines and boilers were made and installed by the Neafie & Levy Ship & Engine Building Co., Philadelphia, Pa. The tug has a bunker capacity for 600 tons of coal and was built for deep-sea towing exclusively. She plies between Boston and Norfolk and Newport News, towing large coal barges.

ATLANTIC BEATS VERGEMERE.

Wilson Marshal's schooner yacht Atlantic which recently won the ocean race for the Brenton's reef cup defeated on Saturday last Commodore A. C. Bostwick's schooner Vergemere in a match race under the auspices of the Larchmont Yacht Club. Both yachts are auxiliaries but used only sails. The Atlantic has three masts and the Vergemere two. The race was over a 25½-mile course for \$1,000 aside. Both yachts carried balloon jibtopsails. The Vergemere carries a balloon main topmast staysail while the Atlantic carries only working topmast staysails. The Vergemere led at the start but when they hauled up on the wind the Atlantic at once began to both outpoint and outfoot her. She steadily increased her lead and won by 3 minutes, 1 second above the five-minute time allowance agreed upon. The Atlantic's time was 3:04:57 while the elapsed time of the Vergemere was 3:13:10, and her corrected time was 3:07:58.

The government dredge Atlantic designed for service in New York harbor was launched from the yard of the Maryland Steel Co., Sparrow's Point, Md., recently, and was christened by Miss Caroline Wood, the daughter of President F. W. Wood of the Maryland Steel Co. The Atlantic is 228 ft. in length over all, 47 ft. 6 in. beam and 25 ft. deep. She is provided with the most modern pumping and dredging machinery and is the fourth of a series of six dredges that the Maryland Steel Co. is building for the United States engineer corps.



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SEPT. 8, 1904.

Mr. Charles M. Schwab, who has just returned from Germany, and Mr. Lewis Nixon, who has just returned from St. Petersburg, both predict a revival of ship building in the United States at the conclusion of the presidential election this fall. Mr. Nixon probably had reference to warship construction of which there is at the present time a considerable amount under way in the ship yards of the United States. As soon as any nation may build warships for Russia it is likely that the American ship yards will be favored with some orders as this country has already built some splendid vessels for the Russian navy. Mr. Schwab, however, had reference to the merchant marine and his predictions are undoubtedly based on good reasons. There has not been for some time the normal amount of ship building in the United States. The causes of this have been various, but the dominating one has been the high price of steel and the fear that it might fall, leaving the ship owner with an expensive article on his hands. This cause has now been removed, steel makers having made concessions and the price of plate is now as low as it is likely to be, probably lower than it will be later on. Now is really the time to place orders for ships as the ship builders can well afford to guarantee the owner against any further fall in the price of plate.

If signs mean anything there will probably be a

great deal for ships to do next year and he who has a modern carrier earliest in the field, constructed at the prices now prevailing, will reap the harvest. On the great lakes it looks especially as though next year would be one of unusual activity in shipping. The movement of ore during the present year is very light, scarcely more than will be necessary to keep the furnaces in blast during the winter. It is likely that the movement next year will begin early and that an enormous quantity of freight will be moved.

Probably by next year also the actual construction of work upon the Panama canal will have been begun which will add greatly to the work of vessels employed in the coastwise trade. Trade with the Philippines too is steadily growing and after next year will be confined to ships flying the American flag. Beyond the Philippines are the teeming millions of the orient, and with an assured market for the American ship as far as the Philippines the conquest of the east will be comparatively easy.

For these services no one can build a ship more cheaply than he can at the present moment and, therefore, now is the time to give orders for ships.

The last campaign which the late Senator Hanna made was for his own election to the United States senate. At the outset of that campaign he was warned not to touch upon the shipping question. Senator Hanna's courage equaled his common sense and he immediately declared that the shipping question was the issue upon which he was seeking re-election to the senate, saying that if the people of Ohio were opposed to governmental aid to shipping they should send some one else in his place to the senate. Senator Hanna's great personal triumph in that campaign is a matter of history. Before his death he clearly defined the shipping question as the leading issue in the campaign of 1904. The lead established by him has now been taken up by Senator Charles W. Fairbanks, the republican candidate for vice-president. Addressing a recent meeting in Maine Mr. Fairbanks called attention to the shipping plank in the platform adopted at the national convention and commended the wisdom of President Roosevelt in having the subject of aid to shipping investigated by a competent commission of ten members. The country is fairly well familiar with the testimony which has been submitted to this commission by representative manufacturers and merchants throughout the length and breadth of the land. Senator Fairbanks was right in declaring the question to be a most important one and the hope which he expressed that the commission might be able to outline a practical remedy is shared by the majority of all the people. The shipping question is no longer one familiar to a few. Ever since the Spanish-American war occurred with its attendant responsibilities the eyes of the American people have been directed to the sea. It is probably true that prior to the Spanish-American war not

one American citizen in ten knew what a battleship looked like; today the man of the street is quite familiar with this formidable instrument of warfare. It is the same way with the merchant marine. American citizens are steadily becoming more acquainted with the fact that an almost imperceptible percentage of our foreign trade goes abroad in American bottoms. As Senator Fairbanks said in his Maine speech there is no sound reason for this condition of affairs. It is not good business judgment. The sum of \$200,000,000 is being annually earned by ships which carry the vast export trade of the United States and of this sum only \$16,000,000 is earned by American ships. In other words, the great sum of \$184,000,000 goes out of the country annually into the coffers of the owners of ships of other nations. The temper of the people is right to remedy this condition and in two or three months we shall know in what form the remedy is to be applied. The Merchant Marine Commission, which has one short tour yet to make to the southern states, will have its report ready to present to congress on Dec. 1, accompanied by a bill which is to be the outcome of its researches.

The bureau of insular affairs of the war department has made public a report showing the total commerce of the Philippine islands for the year ending in March, 1904, as compared with the same period last year. It shows that there was an increase in the total value of both the import and the export of over \$1,000,000. It is interesting to know that there was a decided increase of the volume of business done under the American flag though the aggregate of it was, of course, very slight. The total importation into the archipelago was \$27,800,701, of which amount \$1,535,027 was delivered in American vessels, this being an increase from \$438,094 in 1904. The British vessels, as usual, carried about one-half of the total commerce.

ORE SHIPMENTS FALL OFF 6,813,854 TONS.

August shipments of iron ore did not reach the amount shipped during August of last year, the amount being 4,011,584 tons, as against 4,104,211 tons for 1903, a decrease of 92,627 tons. The total iron ore shipments to Sept. 1 of the present year are 9,615,096 tons which is a falling off of 6,813,854 tons, as compared to the movement up to Sept. 1 of last year, when the shipments aggregated 16,429,854 tons.

The total movement of ore by water last year was approximately 23,500,000 tons, so that 7,000,000 tons were brought down after Sept. 1 last year. As the movement of iron ore since the opening of the season of navigation this year has been proportionately as great as the movement last year, or practically so, it is reasonable to assume that the movement for the balance of the present year will be equal to that of the corresponding period of last year. This would bring the movement for the present year to 16,560,000 or 17,000,000 tons, which was the amount predicted by iron ore authorities at the beginning of the year. Rates, however, have been from 10 to 15 cents lower than they were last year, which, coupled with operating expenses quite as high as they were last year, the disadvantage of a short season and a limited movement of

freight, makes the year an exceedingly lean one for vessel men.

The situation at the upper lake docks has been bad for several days past. Some of the docks were unable to receive another cargo of coal and the vessels were compelled to unload into cars. Surplus tonnage at the head of the lakes has been the rule for some days past. This condition was aggravated during the latter part of last week by stress of weather and the conjunction of Sunday and Labor day making a double holiday. It will be several days before all the vessels at the head of the lakes will get cargoes. The movement of grain has been light, so that vessels have really been depending upon the ore trade which is not of sufficient proportions to keep them all employed. The smaller class of vessels have really suffered badly throughout the entire season.

COMMERCE OF SAULT STE. MARIE CANAL.

The report of Sault Ste. Marie commerce, kept by the superintendent of the canal at Sault Ste. Marie, shows the movement of freight through the canal up to Sept. 1 of the present year to be 7,785,195 tons less than for the corresponding period last year. The amount of freight moved up to Sept. 1, 1904, is 14,842,975 net tons, as against 22,628,170 net tons to Sept. 1, 1903. This loss is to be attributed exclusively to the lateness of the opening of the season of navigation, because, since navigation opened, the traffic has really been very heavy. The August movement of the present year was 5,644,772 net tons, which is an increase of 35,603 tons over the heavy movement of the preceding month, when 5,609,079 tons passed through the canal. The following is the summary of Sault Ste. Marie commerce brought up to Sept. 1:

Movement of Principal Items of Freight to and from Lake Superior.

ITEMS.	To Sep. 1. 1904	To Sep. 1. 1903	To Sep. 1. 1902
Coal, anthracite, net tons.....	518,874	645,894	107,608
Coal, bituminous, net tons.....	2,355,196	3,976,210	2,878,659
Iron ore, net tons.....	8,696,180	14,980,989	15,285,652
Wheat, bushels.....	18,617,797	27,248,292	32,468,000
Flour, barrels.....	1,645,403	3,821,120	4,714,860

Report of Freight and Passenger Traffic to and from Lake Superior, from Opening of Navigation to Sept. 1 of Each Year for Three Years Past.

EAST BOUND.			
ITEMS.	To Sep. 1. 1904	To Sep. 1. 1903	To Sep. 1. 1902
Copper, net tons.....	48,847	59,269	66,560
Grain, other than wheat, bushels.....	8,744,364	11,726,457	4,214,180
Building stone, net tons.....	14,234	8,410	23,132
Flour, barrels.....	1,645,226	3,821,000	4,714,865
Iron ore, net tons.....	8,696,180	14,980,989	15,285,652
Iron pig, net tons.....	21,190	8,963	9,232
Lumber, M. ft. B. M.....	493,324	576,118	672,565
Silver ore, net tons.....	1,313		
Wheat, bushels.....	18,617,797	27,248,292	32,468,000
Unclassified freight, net tons.....	51,748	53,185	74,749
Passengers, number.....	13,881	23,019	22,813

WEST BOUND.			
ITEMS.	To Sep. 1. 1904	To Sep. 1. 1903	To Sep. 1. 1902
Coal, anthracite, net tons.....	518,874	645,894	107,608
Coal, bituminous, net tons.....	2,355,196	3,976,210	2,878,659
Flour, barrels.....	107	30	135
Grain, bushels.....	625	1,000	9,577
Manufactured iron, net tons.....	69,904	88,569	93,126
Salt, barrels.....	218,867	256,253	271,438
Unclassified freight, net tons.....	283,485	307,945	352,897
Passengers, number.....	13,946	23,195	22,723

Summary of Total Freight Movement in Tons.

	To Sep. 1. 1904	To Sep. 1. 1903	To Sep. 1. 1902
East bound freight of all kinds, net tons.....	10,576,709	17,593,297	18,163,288
West bound freight of all kinds, net tons.....	4,266,266	5,061,873	3,476,102
Total freight, net tons.....	14,842,975	22,655,170	21,639,390

Total number of vessel passages to Sept. 1, 1904, was 8,083, and the registered tonnage, 10,911,634.

H. H. Richardson, of Redondo, Cal., has given contract to G. H. Hitchings, Hoquiam, Wash., for a vessel 85 ft. long, 27 ft. beam and 9 ft. 6 in. deep.

LIVERPOOL SHIPPING LETTER.

Liverpool, Aug. 29.—The Atlantic rate war has again occupied a good deal of attention in shipping circles here during the past week in consequence of the reduction of the first and second saloon fares for eastward traffic. The Cunard company as I noted in my last letter commenced the cutting in this direction and, as was anticipated, the continental lines have followed suit. All the leading Atlantic lines are now therefore carrying first and second cabin passengers eastwards at from \$15 to \$35 cheaper than previously. Westwards, the first and second saloon rates are unaltered, and so long as the traffic to America is as brisk as at present, there is no fear of any reductions being made, for every outward-bound steamer is practically booked up until well on into next month. With regard to the Cunard company, it may be mentioned that despite the fact that the rates charged by this line are higher than a good many competitive lines, the company still seem to secure more passengers than their vessels can carry. The *Carpathia* on Tuesday took out to New York no fewer than 2,000 people, whilst the *Umbria* and *Saxonia* on their last sailings were absolutely full; and it is stated that in regard to the *Saxonia*, a large number of third-class passengers had to be left behind for the next sailing. The White Star Line is also, it must be said, getting its share of the westward traffic, for the *Baltic* which sailed on Wednesday for New York has 1,800 third-class passengers, 260 second and over 400 saloon. It is thought by those likely to know in shipping circles that no more reductions in passenger rates will be made, at any rate for the present. The energy with which the rate war is being carried on in Liverpool is being severely felt, and speculation is rife as to whether the sweeping reductions made in steerage rates has stimulated business to any extraordinary degree. The fact that the *Westernland* on Wednesday had not a full complement of steerage travelers at the \$7 rate, indicates that even this cheap rate has not attracted as many emigrants as might have been expected. The Cunard company remain silent as to the attitude they intend to adopt in view of the wholesale reductions made by the continental lines for the eastward journey. The fact, however, remains that even the Cunard Line must be losing the difference between the prevailing rates and those ordinarily charged, but the general opinion seems to be that the German lines are being hit the hardest in the struggle. Rumor has it that the Germans are recouping the combine for the loss sustained between the old British rates and the reduced fares, and if there is any truth in this, the Germans must be suffering very severely for, in addition, the Cunard company are tapping all the continental business they can, and carrying the emigrants via Liverpool. On the other hand, the German lines are attacking the Mediterranean services of the Cunard company. It is reported that the Hamburg-American Line will inaugurate a new Atlantic steamship service on Oct. 1 between New York, Naples, Genoa, Trieste and Fiume. The service will be fortnightly, and will be maintained by the new fast twin screw steamships, *Prince Adelbert*, *Prince Oskar*, *Phoenician* and *Palatia*. The Hamburg-American Line are cutting into the Cunard's business in other directions for, as recently stated, they have just commenced a new line of steamers between London, Liverpool, and Glasgow to the Adriatic. The first steamer, *Beeswing* is at present here, and is due to leave the Mersey in a day or two. The Cunard Line have had a Mediterranean-Adriatic service for years, and the advent of the Hamburg-American Line in this particular business may be taken as another effort to wrest trade from the Cunard Line.

At the time of writing, I am authoritatively informed that arrangements have been made for a meeting to be held at Frankfurt, Germany, on Aug. 29, between Lord Inverclyde and Mr. Ballin, representing the Cunard company and the continental companies respectively, they being the principals in

the controversy which has for some time been disturbing the Atlantic passenger trade. It is to be hoped that on this occasion a solution of the existing difficulties may be found. I also learn that Mr. Bruce Ismay and Sir Clinton Dawkins, representing the combine lines, have been invited to be present, unofficially, at this meeting, and they will probably attend.

There was successfully launched on Thursday by Messrs. Workman, Clark & Co., Belfast, the steamer *Victorian* of 12,000 tons, the first of two turbine-driven ships ordered by the Allan Line. The second, which is building on the Clyde, is to be named the *Virginian*, and will be a sister ship to the *Victorian* as regards dimensions, capacity and power. The pair will form a notable reinforcement to the fine fleet of the Allan Line, which already numbers twenty-eight steamers, and comprises several of 10,000 tons, each engaged in the mail, passenger and general service between the United Kingdom and Canada. The *Victorian*, which is expected to be ready for sea before the end of the year, is the pioneer turbine vessel for the Atlantic or any other ocean service, and is one of the handsomest craft ever built at Belfast. Messrs. Allan have previously led the way in many prominent advancements in connection with Atlantic craft, and therefore they are the more to be congratulated as the pioneers in the adoption for ocean travel of a means of propulsion which it is believed has such a great future. The fact that the *Victorian* marks a departure which may revolutionize the character of the ocean liner from a ship builder's and passenger's standpoint, renders her an object of particular interest to the shipping world. The length of the *Victorian* is 540 ft.; her breadth 60 ft.; her depth, 40 ft., 6 in.; and she is divided by bulkheads into eleven compartments; whilst with the sub-divisions of her double bottom, she has twenty watertight spaces. She is built to the highest class of the British Corporation registry of shipping, and her hull has been specially strengthened above the requirements of the corporation in order to make her doubly secure against the heavy weather of the North Atlantic. When ready, the *Victorian* will take her place in the Liverpool and Canadian service. She is largely an experimental ship, and by her trial trip, the problem will practically be solved of whether turbines will successfully propel ocean steamers. Whatever may be the result, with the Allan Line will rest the honor of leading the way with an important economical venture. Originally, the *Victorian*, the keel of which was laid ten months ago, was designed to be driven by reciprocating engines, but after some progress had been made with the hull, and while other companies were hesitating to plunge into a practical experiment which might involve heavy loss, Messrs. Allan boldly assumed the responsibility of giving the lead, and decided that the new vessel should have turbines. Messrs. Workman, Clark & Co. made the necessary alterations in her structural design, and at the same time undertook what was a far more difficult and delicate task, the construction of the great turbines—the largest ever made—which are to drive her. This was by arrangement with Messrs. Parsons & Co., for it was the Parsons turbine that was decided upon. A high pressure and two low pressure turbines will drive the three propellers of the ship, which, by the way, strike one as being unusually small to drive a monster possessing a cargo capacity of more than 8,000 tons, besides accommodation and equipment for upwards of 1,300 passengers. These propellers, however, revolve at very high speed—from 270 to 300 revolutions per minute. The central one, arranged as in a single screw vessel, is worked by the high pressure turbine, the others, which are arranged as in a twin screw ship, by the low pressure turbines. The two latter have each a reversing arrangement which enables them to be driven full speed astern, either together or independently. Thus the ship will be as easily and effectively maneuvered as regards turning or backing as an ordinary twin screw. This disposes of the objection

which has sometimes been urged against turbines, that they are defective with regard to reversing motion.

Messrs. Swan, Hunter & Wigham Richardson, Ltd., of Wallsend-on-Tyne, have completed a working model of the new turbine liner at present being constructed at their yard for the Cunard company. During the last few days, they have been experimenting with this boat to ascertain the best positions for certain machinery. The liner is to be a four-engine boat, with four lines of shafting, and the model—which is about the size of a large launch—has been tried in the Tyne Howdon docks with a view to obtaining the best working position for the shafting.

The retirement which I noted in a recent letter of Capt. Lindsay, R. N. R., late of the Celtic, from the service of the White Star Line after 22 years service, was not allowed to pass without some proof of the appreciation in which Messrs. Ismay, Imrie & Co. held that distinguished officer. This mark of their esteem took the form of a very handsome silver salver, suitably inscribed, which Capt. Lindsay will doubtless ever value as a souvenir of an honorable career under the famous White Star flag.

It is reported here that a new line of steamers is about to be started between Panama and the extreme east. The steamship Kensington of Glasgow has been chartered for a trial trip, and it is proposed to extend the service should the trip prove successful. The organizers of the new service are Peruvian capitalists and Chinese merchants established in Lima. The Kensington is a vessel of 3,000 tons capacity with accommodation for about 250 passengers.

The monthly approximate traffic return of the Manchester ship canal for July shows that the total receipts were \$155,220 against \$143,675 for July last year. For the seven months of the present year there is an increase of \$57,430.

UNITED FRUIT STEAMER SAN JOSE.

The steamship San Jose, the latest acquisition to the fleet of the United Fruit Co., arrived at Boston last week on her maiden trip from Port Limon, Costa Rica. The entry of the San Jose into this service is fraught with more than usual interest from the fact that she is the largest fruiter ever constructed for service between the West Indies and the United States and is also the first vessel equipped with refrigerating machinery to arrive at Boston, which enables her to make long passages with perishable cargoes. The keel plate of the San Jose was laid at the ship yard of Workman, Clark & Co., Belfast, Ireland, about nine months ago. The fruit company contracted with these builders for the construction of three steamers of the same size, all for this trade. The San Jose was the first to be launched. Her general dimensions are: length between perpendiculars 330 ft., length over all 345 ft., breadth, moulded, 44 ft., 3 in., depth of hold to the upper deck 31 ft., 3 in. She is rigged with two pole masts, has three complete steel decks; also topgallant, forecastle and crop decks of wood, the latter extending throughout the forward part of the vessel. The engines and boilers are enclosed at all the decks by steel casings.

The novelty in the ship is the introduction of refrigerating machinery. The cargo space is divided into separate compartments by steel bulkheads, which extend to the upper deck. All these holds and tween deck spaces are insulated, and a very complete and efficient system of refrigerating machinery, with air ducts to every compartment for the preservation of the fruit during transport, has been fitted. By this means a low temperature can be secured in the tropical climates and the fruit landed here in the best possible condition. Each hold is fitted with a large hatch, supplied with the necessary steam winches, derricks, and special appliances for the expeditious and careful handling of the fruit cargoes.

A large steel deck house has been built on the upper deck amidships and at the fore end of this house is placed a

dining saloon with the passengers' staterooms opening on each side. A stairway from this saloon leads up to a steel deck house on the promenade deck above in which are additional staterooms and a smoking room. Rooms for the engineers and officers are provided in the midship deck house and the quarters of the crew are in a deck house at the after end of the upper deck.

The spacious saloon is paneled in polished oak in a handsome manner and is furnished with sofas, revolving arm chairs, etc. The floor is covered with Brussels carpet, while the chairs and sofas are upholstered in moquette. The staterooms are finished in white enamel with comfortable sofas, running water, etc., and are all richly carpeted. The smoking room and other apartments are prettily furnished and the lavatories are finished in white enamel with tiled flooring, etc.

The framing of the vessel consists of main and reverse frames of angle steel, to the entire exclusion of web frames except in the engine and boiler spaces. The stem is of rolled malleable steel carried above the forecastle deck. She is provided with bilge keels to minimize the motion of the ship and her cellular bottom is divided into four compartments. She has steam steering gear and electric lighting plant and carries a powerful searchlight.

The machinery consists of a set of triple-expansion engines of the latest type, with all the auxiliaries necessary for a modern steamer. The cylinders are 25, 41 and 68 in. in diameter with a 48 in. stroke. Steam is supplied by three steel cylindrical multitubular boilers, 13 ft., 6 in. in diameter, 11 ft., 6 in. long, each with three furnaces and having a total grate surface of 150 sq. ft., while the heating surface is about 6,000 sq. ft. The working pressure of the boilers is 190 lbs. to the square inch. The San Jose was constructed under the supervision of the British Corporation surveyors and qualified for their highest class. The San Jose is commanded by Capt. William Owen, formerly in the Atlas Line and an experienced navigator. She carried a crew of forty men in all departments.

This immense fruiter calls attention to the evolution in this particular branch of our commerce. In 1870 Capt. Lorenzo D. Baker conceived the idea of bringing bananas to Boston from Jamaica and with the comparatively small schooner Telegraph he made his first venture in this trade. For several years schooners made occasional trips between Jamaica and Boston, bringing small cargoes, which found a ready market there. In the early '80's the auxiliary steamers Jesse Freeman and Lorenzo D. Baker were placed in the trade and later on these were followed by more modern boats, especially built for the trade. The business made phenomenal strides and at the present time the United Fruit Company own or have under charter a fleet of seventy-five steamers plying between their own plantations in Costa Rica, Colombia, San Domingo, Jamaica and Cuba. Lines are operated to New Orleans, Mobile, Baltimore, Philadelphia and Boston and the fleet includes some of the finest vessels in the West India trade.

The San Jose on her trial trip exceeded her speed requirements. While her speed is less than vessels of the greyhound class it is ample to enable her to make excellent time between the fruit producing countries and Boston, her great size insuring that she will keep time irrespective of the weather with the precision of the average railway train.

The vessel has a capacity for 45,000 bunches of bananas but on her present voyage she was not filled to the limit. The steamer Limon, the second of the trio, has been launched and is now about ready for commission, while the Esparta will leave the builders' yard in a few weeks. Capt. William Anderson, the marine superintendent of the fruit company, has been at Belfast for the past few months, superintending the completion of these huge fruiters.

CHICAGO GRAIN REPORT.

Chicago, Sept. 6.—Shipments at this report compare well with the previous week and the similar period of a year ago, but the movement is still a little under current vessel demands. Rates have ruled about unchanged at 1 cent for corn and $7\frac{3}{8}$ cents to 1 cent for oats to Buffalo, Georgian Bay and Port Huron. Montreal traders are favored slightly, though there is an improved export demand in corn, and the rate basis—nominally at $3\frac{1}{4}$ cents—is attracting a fair line of engagements.

With the surrounding shipping points under low pressure, expectations hardly incline toward any immediate substantial improvement in rates; nevertheless, the local position is essentially strong and shaped to follow any improving tendency. There is quite a steady accumulation in grain stocks, the receipts of the past week—some 1,400,000 bu. wheat, 3,380,000 bu. corn and 2,350,000 bu. oats—about double the year ago arrival.

The weekly shipments are distributed as follows: Via all rail lines—Of wheat, 160,000 bu.; of corn, 175,000 bu., and oats, 416,000 bu. Via lake to Buffalo, etc.—Wheat, 144,000 bu.; corn, 1,300,000 bu., and oats, 270,000 bu. Via lake to Canada points—Corn, 690,000 bu., and oats, 225,000 bu.

Lake and Rail Shipments—

	This week.	Last week.	Same week last year.
Wheat	323,514	417,550	141,510
Corn	2,172,866	1,797,738	2,199,950
Oats	912,050	993,414	853,924
Totals.....	3,408,370	3,208,702	3,195,384

	Shipments since Jan. 1, 1904.	Same time last year.
Wheat	9,720,113	13,287,467
Corn	46,199,440	56,334,262
Oats	31,750,960	44,600,231
Totals	87,670,513	114,311,960

Stock of grain in elevators:—

	This week.	Last week.	Same week last year.
Wheat	3,680,000	3,278,000	6,303,000
Corn	3,773,000	2,802,000	4,230,000
Oats	7,304,000	5,807,000	4,347,000
Rye	641,000	587,000	428,000
Totals	15,398,000	12,564,000	15,308,000

TURBINE STEAMER FOR LAKE MICHIGAN.

It is announced from Chicago that the Dunkley-Williams Co. have given a contract to the Craig Ship Building Co. of Toledo for the construction of a turbine steamer for use in the passenger trade between Chicago and South Haven. This will be the first turbine steamer to be constructed on the great lakes, the one at present running between Toronto and Hamilton in the service of the Turbine Steamship Co. having been constructed by Hawthorne, Leslie & Co. at Hebburn-on-Tyne, England. The new steamer is to be known as the Turbine Queen and is expected to go into commission next spring. The new vessel will be 275 ft. long, 42 ft. beam, and will be equipped with turbine engines of the Parsons make, driving three screws. The steamer will be especially adapted for the excursion trade, with a large dance hall on the main deck and a dining-room extending flush to the sides of the vessel.

The cargo of oats of the propeller Wyoming, which was damaged by fire at Midland, near Port Huron, is being lightered, the work having been started several days ago. The Wyoming went aground at Midland last week and caught fire while trying to release herself. She will go to Port Huron for repairs.

LAW OF THE SCREW PROPELLER.

Editor Marine Review: I have for many years been intimately connected with the most famous mathematicians and men of science in many parts of the world to whom the progress of naval science is greatly indebted, and with regard to ship propulsion, the words of John Ericsson: "The knowledge of the law governing the action of the screw propeller would open unknown possibilities in naval construction and save millions now annually expended in experimental attempts to improve the speed of vessels by trying new propellers, which, without sufficient guide of science, is merely like groping in the dark," and the importance and benefits to ship builders, marine engineers and ship owners in possessing the knowledge how to provide ships at once with the best possible propeller without further change or experiment and determine their speed before trial, have prompted me to make generally known that this great problem, the grandeur of which with every passing decade appears to assume a more formidable aspect, having claimed the attention and defied the acumen of the most eminent of men, has to my personal knowledge been successfully solved by a man of high scientific attainments, who has devoted upwards of thirty years to higher mathematical problems and researches in connection with naval architecture.

The law of the screw propeller, absolutely demonstrated by pure mathematical deductions, does not admit of doubt or experiment. Its truth can be readily proved and its reliability has already been confirmed by practical tests on large ships, which showed astonishing results in increase of speed with smaller consumption of coal. In the case of new inventions of screw propellers upon novel ideas and fanciful shapes, even a rough calculation will, without any experiment whatever, with sufficient certainty display its merit or expose claimed impossibilities.

With regard to fluid resistance and the shape of hulls, an interesting feature is that a body moving in a horizontal direction with a certain velocity through the water while entirely submerged below the surface, creates but little or no waves, and must therefore meet with less resistance to its progress than it would have moving with the same velocity when only partly submerged like a vessel, which must rupture the surface of the water and cause waves of more or less extent, according to its form. As an instance of practical experience, it may be mentioned that torpedoes, when first brought into use, had the forward end very sharp and pointed, while at the present day, although moving with very much greater speed, they have the forward end far less pointed, being of a more "bluff" shape than ordinary vessels designed for low speed.

As usually designed and constructed, the hull of a vessel is formed so as to make its entrance or forward end more sharply pointed near the keel or bottom than at or near the surface of the water. In other words, the waterlines become sharper or their angle of obliquity with the longitudinal middle plane of the vessel larger at or near the load waterline than nearer to the bottom. Hence the areas of the respective waterline planes decrease from or about the load waterline toward the bottom of a vessel, and consequently the volume of displacement of a portion of the hull contained between two waterline planes must be larger than the volume of displacement of another portion of the hull contained between two waterline planes nearer to the bottom of the vessel, the vertical height between the planes of these two portions of the hull being equal, and it follows, therefore, that the displacement of the vessel diminishes as weight is discharged from her in an increasing ratio for each foot of water of her draught as she is lightened; but the deepest always-submerged portion of the hull has comparatively the least resistance, since it creates no waves, and hence it may clearly be concluded that instead of being sharper (having more pointed waterlines with smaller angles of obliquity to the longitudinal vertical middle plane than nearer to the surface) that portion of the hull may, in

AROUND THE GREAT LAKES.

The striking dockmen on the Wisconsin Central docks resumed work last week at the ten-cent raise offered by the company.

The famous North point lighthouse off Cheboygan, after service of more than forty years, is to be replaced by a new steel structure.

F. B. Spear & Sons have installed a McMyler hoist on their coal dock at Marquette. It has a capacity of 600 tons per day using one bucket.

The Dominion cruiser Vigilant for service on Lake Erie was launched from the yard of the Polson Iron Works, Toronto, Ont., last week.

The steamers Jay Gould and Mataafa were fined each \$200 by the customs officials at Duluth last week for violating the rule governing the passing of vessels in St. Mary's river.

W. J. Hingston and B. L. Coles who recently bought the Erie Basin Ship Building Co., Buffalo, will install a floating dry dock of 1,000 tons lifting capacity. It was purchased at Bay City and will be towed in sections to Buffalo.

Capt. George C. Stevenson of Buffalo has been appointed master of the steamer Rappahannock of the Davidson fleet. He was one of the list of first class masters who were left without berths at the close of the masters' and pilots' strike.

President Livingstone of the Lake Carriers' association has opened negotiations with the Canadian government for the establishment of a fog signal station at Colechester. Down bound vessels are likely in thick weather to strike Grecian shoals.

It is expected that the car ferry building for the Michigan Central railway at the yard of the Great Lakes Engineering Works at Detroit will be launched about the middle of October. The ferry will be launched with engines and boilers aboard.

The first ocean steamer to take a shipment of grain direct into her hold from the new grain elevator at Montreal was the Hurona of the Thompson Line Aug. 24. She received 20,000 bu. of wheat in a short space of time and loaded for London.

The schooner Black Hawk while being towed up the river at Milwaukee last week ran into the Grand avenue bridge and did considerable damage. The accident was caused by failure to move the draw in sufficient time to let the schooner through.

At a meeting of the Lake Line Managers' association held in Chicago last week for the purpose of fixing the fall tariffs it was decided to let the rate sheets stand as they are for a time. The meeting was adjourned until Sept. 14 when some action must be taken.

The owners of the Mascotte maintained that the steamer loses much time in running around the island because there is no draw in the bridge. There is 7 ft. of water under the structure. The bridge is an abandoned one and has not been used for several seasons.

The most valuable cargo that can be put into a vessel in bulk on the lakes is flaxseed. The Sahara of the Tomlinson fleet, the second largest carrier on the lakes, brought down 340,000 bu. of flaxseed from the head of the lakes last week, which at current prices aggregated in value nearly half a million dollars.

The government dredge Burton recently completed at the yard of the Maryland Steel Co., Sparrow's Point, Md., for service on the great lakes has been ordered to Philadelphia. Major Dan C. Kingman, government engineer in whose district the dredge was designed for service, does not understand the Philadelphia assignment.

Capt. James Reid of the Reid Wrecking Co., Sarnia, announces that he will put another wrecking lighter in the rivers. He will remodel the steamer Manistique, taking out the present hatches and making one continuous hatch the

whole length of the deck. Steel combings on the railroad track will be put in and a McMyler clam shell hoist installed.

Lieut. Col. Davis, United States engineer in charge of the Detroit district held a public hearing this week to ascertain whether the old Michigan Central bridge between Grosse Isle and Stony Island should be removed as an obstruction to navigation. The hearing was held at the instigation of the owners of the steamer Mascotte who claims that the old bridge which was built in 1872 is an obstruction.

Judge John R. Hazel of Buffalo has handed down a decision in the libel proceedings instituted against the steamer Tacoma and the tugs Conneaut and Hebbard by the old steamer Crystal in which he relieves the Tacoma from all responsibility for collision which occurred on Aug. 30 a year ago and places the blame upon the tugs. He holds the persons in charge of the Conneaut especially in fault for having backed the tug into a pier and having broken her wheel so that the course of the Tacoma could not be guided.

Fire completely destroyed the lumber schooner Verona at Fisher & Roland's lumber yard at Toledo last week. When the freshet of last spring occurred the schooner was torn loose from her moorings and carried down the river. She was left among the lumber piers far removed from the ordinary bed of the river. Mr. J. C. Gilchrist of Cleveland, her owner, abandoned her to the underwriters who were at work upon the task of relaunching the vessel when the fire occurred. The Verona was built in 1873. She was 189 ft. keel and 34 ft. beam.

Capt. Harris W. Baker, the wrecker, completed last week the task of raising the steamer City of Berlin which was sunk in collision with the steamer Chili on the night of Aug. 7. The collision occurred somewhat north of Belle Isle but the Berlin drifted down the river and sank in the channel opposite the island. Capt. Harris built a cofferdam about the ship 15 ft. or more from the bulwarks up as watertight and as staunch as the ship herself. Canvas jacketing was put above the cofferdam and as the water was pumped out of the steamer she began to rise until she reached her normal draught. Fires were then built under the boilers and the vessel was safely taken to dry dock, completing a most successful wrecking operation.

OBITUARY.

M. E. Harris, general foreman of the Ship Owners' Dry Dock Co. of Chicago, died at Geneva, Ill., last week.

Mrs. Mary Lee Chamberlain, the wife of Mr. Eugene Tyler Chamberlain, United States commissioner of navigation, died at Providence hospital in Washington last week. She was the daughter of Capt. Dudley P. Barrett of Baltimore who was an officer in the Confederate army. Mrs. Chamberlain had been ill for several months and her death, while not unexpected, is greatly deplored. Mr. and Mrs. Chamberlain had been married a little over four years. Mrs. Chamberlain was very popular in the official life of Washington.

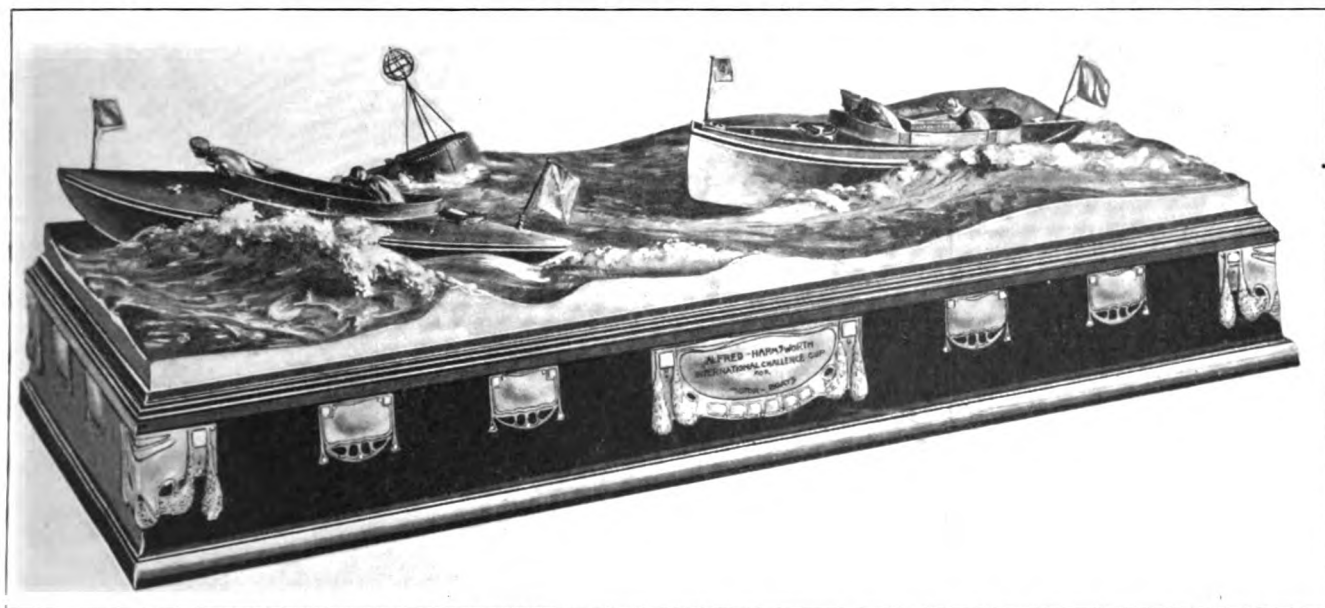
Bids were opened at Washington last week by the navy department for the construction of a dry dock at the New York navy yard. The lowest bid was submitted by C. B. Spearin of New York, whose bid was \$673,292. The highest bid was that of the Keystone Construction Co. of Syracuse, N. Y., which amounted to \$908,000. The limit of cost was placed by the department at \$1,000,000.

It is understood that the battleship Georgia will be launched from the Bath Iron Works, Bath, Me., on Oct. 10. It is quite likely that the daughter of Gov. Terrel of Georgia will name the ship. The progress was retarded last year by the extreme severity of last winter and also by radical changes which the navy department made in the plans of the ship.

FRANCE GETS THE HARMSWORTH CUP.

In the recent race for the international trophy, known as the Harmsworth cup, which took place on the Solent, England, two boats, the Napier II and Napier-Minor, were England's representatives. The races were run off in heats, both the Napier II and the Napier-Minor winning their respective heats. The contest dwindled down to but two boats for the final—Napier II and Trefle a Quartre. Just prior to starting in her heat with the Napier-Minor the Napier II damaged her bow and when the time arrived for the final struggle she leaked so badly that the Napier-Minor was substituted in

owned by George Hall of Ogdensburg, N. Y., was the winner. The second race was for boats over 50 ft. rating and there was considerable rivalry over the merits of the various boats entered in this class. The Too Easy was first home, owned by Mr. Willis S. Kilmer of Binghamton, N. Y. The Radium, owned by Dr. E. E. Campbell of Alexandria Bay, was second; and the Chip, owned by J. Wainwright of Philadelphia, Pa. On time allowance the race was won by the Chip. The course was covered in 1 h. 8 m. 33 s. It was the most successful meet held this season, and if all that is said is true, next season will find numerous contests under the auspices of this club.



THE INTERNATIONAL OR HARMSWORTH CUP.

The donor of this trophy is Sir Alfred Harmsworth, proprietor of the Daily Mail, London, Eng. The trophy is in bronze, mounted on an ebony pedestal with silver name plates round the pedestal. The large one in the centre bears the following inscription:

"Alfred Harmsworth, International Challenge Cup for Motor Boats."

her place. No objections were made at the time and the Napier-Minor and Trefle a Quartre raced, the former beating the latter by 1 m. 15s. The Frenchmen did not take defeat very kindly and finally after making a careful study of the rules, etc., entered a protest. The protest was referred to a committee, who have just made their decision known and is to the effect that the Napier-Minor is disqualified and the race given to her opponent, the Trefle a Quartre. The protest of the Frenchman was on the grounds that Napier-Minor, which had been eliminated in the trial heats, was run in the deciding one in place of the Napier II. The committee to whom the protest was made consisted of a representative of each of the competing clubs, England and France, and a representative of the donor, Mr. Alfred Harmsworth. No provision was made, either in the deed of gift or rules governing the races covering a case of this character and the committee strongly recommended that the rules governing the competition for the cup should be amended in such a manner as to cover all points regarding such a substitution.

MOTOR BOAT SEASON AT THOUSAND ISLANDS.

The last of the series of motor boat races given under the auspices of the Thousand Island Yacht Club occurred on Monday. The starting was made from the club house on Alexandria Bay and the course was $21\frac{3}{4}$ miles. Long before the time set for the race people began to arrive at the club house, coming in all sorts of conveyances, and never before were as many people present to witness a motor boat race. The first race was open to boats of less than 50 ft. rating. The Kitten

The racing was under the rules and regulations of the American Power Boat Association, of which the club is a member.

LAMB BOAT & ENGINE CO.

The Lamb Boat & Engine Co., Clinton, Iowa, report that they have built this season some eighty odd power boats, ranging from 18 ft. to 45 ft. They have now in course of construction five 18-ft. open launches, a 50-ft. full cabin launch, a stern-wheel output of 24 H. P. for the Ouachita river, Arkansas, and a 135-ft. double deck stern-wheel steamer of 500 H. P. for the Mississippi river. This vessel is really a combination houseboat and steamer. The company has just delivered to Mr. C. H. Deere, Moline, a 120-ft. double decked houseboat which is elaborately furnished. The company has also built several boats of the so-called auto boat type, although not of racing machine construction. However, one of the boats, the Henry F. Kath, has cleared up everything on the Mississippi river. Mr. Kath is a pearl and shell buyer. His business takes him up and down the Mississippi river and its tributaries. The boat so far has traveled in the neighborhood of 5,000 miles without any repairs. The company is also building two and four-cycle motors of such design and workmanship that they expect them to become very popular.

A DELAWARE RIVER LAUNCH.

The accompanying illustration is that of one of the most serviceable gasoline yachts on the Delaware river. It is owned by John J. Leary and James McMasters of Chester,

Pa., and since it was placed in commission has been in extensive use for the purpose of outing parties down the river and bay and has proved itself entirely seaworthy. The yacht



LAUNCH OWNED BY JOHN J. LEARY AND JAMES McMASTERS, CHESTER, PA.

was designed and built by Ball & Richardson, Marcus Hook, Pa., and is driven by a 40-H. P. Globe engine. Its dimensions are 60 ft. over all, 12 ft. beam and 4½ ft. draught. It is fitted with cabins, forward and aft, and has sleeping accommodations for about twenty persons.

MOTOR BOAT NOTES.

The motor boat Standard, purchased by Price McKinney of Cleveland, ran on a rock near Ogdensburg last week and was laid up for repairs. There seems to be no possibility of a race between the Standard and Adois this year.

The Racine Boat Mfg. Co., Muskegon, Mich., recently closed contract for a 70-ft. twin screw steel turbine steamer with compound engines and water-tube boiler for use in southern waters. The company is now turning out two of its regular stock launches per day and ten row boats and canoes. This is in addition to large cabin work which includes boats 40 ft. and over.

As a result of an explosion which occurred on board the Challenger while opposite the Knickerbocker Yacht Club at College Point, Long Island, she will be temporarily put out of commission until repairs are made. She was en route from New York city to Port Washington, Long Island, to take part in a motor boat race when the accident occurred. It came to anchor opposite the club house to make what was thought some minor repairs. The explosion was caused through some leak in her gasoline tank. The explosion blew out her piston and damaged her machinery so that she had to be towed back to the factory.

The committee having in charge the races for the Gold Challenge cup on the Hudson river, New York city, are more than pleased with the interest that has been taken by the numerous clubs who are members of the association. Several new boats will take part and if rumor has it correct some very fast time, if not new records, will be made. Some alterations are now being made to the Shooting Star and it is said when she makes her next appearance will be far speedier than heretofore. The entries close on Sept. 12 with Mr. Geo. A. Branson, secretary Columbia Yacht Club, 76 William street, New York city. The committee in charge is composed of Col. Fred. A. Hill representing the Manhasset Bay Yacht Club, the challenger; F. J. Stone representing the Columbia Yacht club, the present holder of the trophy; and Mr. H. de B. Parsons of the American Yacht Club. The races will take place Sept. 22, 23 and 24.

A meeting of the executive committee of the National Association of Engine and Boat Manufacturers has been called for Tuesday evening, Sept. 13, at the Manhattan hotel in New

York city. The call for the meeting states that matters pertaining to a national show will be discussed and decided upon as well as sanctions for other shows granted and new members elected. While there have been motor boat shows, if the National Association of Engine and Boat Manufacturers hold a national show this year or shortly after the first of next, it is needless to say that it would be one of the greatest shows of its kind ever attempted either in this country or any



GOLD CHALLENGE CUP AMERICAN POWER BOAT ASSOCIATION.

foreign country as its membership is composed of the leading engine and boat builders in the United States, and all would no doubt do what they could to make it a grand success. After Nov. 1 all applying for membership in the association will have to pay an initiation fee of \$25 for active members and \$15 for associate.

STORAGE BATTERY OF NEW ENGLAND MOTOR CO.

The New England Motor Co. of Lowell, Mass., are placing upon the market a line of storage batteries for stationary and vehicle work, which, while not exhibiting anything startlingly novel in their construction, still show features of merit. The cells are of the pasted type. The oxides are applied to moulded grids in the usual manner. The negative plates, after being formed, are subjected to considerable pressure, so as to consolidate the spongy lead and make it more adhesive. The positive grids are oxidised before being pasted. In the vehicle type cells, grooved wooden separators are used. The wood is treated by a special process to prevent the formation of acetic acid or gum-dextrin. The details of this process are not given, but it has been the result of considerable experimentation on the part of the company. The New England Motor Co. have been building these batteries for some two and a half years, and using them on automobiles and launches, with a view of thoroughly testing their efficiency and capability of withstanding hard usage. The result has more than come up to their anticipations.

While no special effort has been made to obtain large output per pound in the vehicle type cells, still the performance

is very creditable. The 150-ampere hour cell at 4-hour rate weighs complete 28 lbs., and this is said to be lighter than any other cell of equal capacity on the market, being an output of 10 watts, at 4-hour rate, per pound, complete cell. At the same time, the grids are of such a form as to give great mechanical rigidity, so that, as above stated, mechanical efficiency has not been sacrificed for weight.

Special machinery has been designed for the production of the plates, and prompt shipments can be made in almost any quantities. The company will, upon application, be pleased to furnish bulletins descriptive of these storage batteries.

STEAM TURBINE CONDENSING OUTFITS.

At the present time much interest centers in the steam turbine, which promises to reduce the weight and cost of prime movers. Two large machines of this type are on exhibition in block 51, aisle 1, and block 44, aisle 10, machinery building, at the St. Louis fair, one being shown by the Westinghouse Machine Co. and the other by the General Electric Co. Economic utilization of the energy of steam requires its expansion to the lowest possible pressure, which in the turbine is accomplished without the usual losses due to the corresponding extremely low temperatures. In actual service the economy of the turbine is increased by approximately 3 to 5 per cent for each inch of vacuum higher than 26 in. It is therefore of vital importance that all losses should be reduced to a minimum. The absence of oil from the steam renders the use of a surface condenser desirable in places where the saving of condensed steam is important. The fact that the final temperature of the condensing water must be comparatively low necessitates the highest degree of efficiency in its use and the immediate and complete removal of all noncondensable vapors, whose presence would increase the absolute pressure and consequently reduce the efficiency of the turbine.

The steam from the Westinghouse-Parsons turbines at block 51 is condensed in a 1,500-sq. ft. condenser, supplied by Henry R. Worthington. The air is removed by a Worthington rotative dry vacuum pump of the center crank type, but similar in other respects to the horizontal pumps already described. An air cooler is interposed between the condenser and the vacuum pump, considerably increasing the capacity and efficiency of the latter. The condensed steam is removed from the condenser by a Worthington volute pump directly connected to an induction motor. The operation of this pump is very interesting, since it requires neither valves nor floats and is not subject to vapor binding, as are reciprocating pumps. The pump is placed below the level of the condenser, receiving the water by gravity and its capacity is such that it runs ahead of the supply, so that the suction pipe is never full. The discharge pipe is, however, always full and pressing back against the pump, but so long as the latter is in motion there is no possibility of the water passing back to the condenser so no anti-siphon devices are needed. In another turbine plant a pump of this character returns the hot water directly from the surface condenser to the boiler against a pressure of 250 lbs.

The Curtis steam turbine, exhibited by the General Electric Co. in block 44, is of the vertical type, and the condenser is placed in the base of the steam turbine. It contains 8,000 sq. ft. of tube surface and was built by Henry R. Worthington. The air is removed by a rotative dry vacuum pump, similar as regards the air end, to those heretofore described, but driven through the medium of a silent chain by an electric motor.

The tug J. C. Schoellkopf was launched in the Niagara river at Port Day by the Niagara Falls Power & Hydraulic Co. this week. The tug is 60 ft. long and 14 ft. beam, and is the first vessel to be launched at this place since the *Maid of the Mist* entered the water in 1892.

PERSONAL.

Mr. George B. Crassweller, for many years superintendent of the Wyandotte yard of the Detroit Ship Building Co., has resigned.

Mr. A. W. Perry of Boston has been elected president of the Canada Atlantic & Plant Steamship Line. Mr. E. L. Wires of Boston has been made treasurer.

Mr. Thomas E. Young, who recently resigned his position as manager of the coal department of M. A. Hanna & Co., was presented with a beautiful hand-wrought tea set by the employees of the coal department last week.

Mr. E. S. Wheeler, assistant chief engineer under Lieut. Col. Charles E. L. B. Davis, government engineer at Detroit, has been selected by President Francis of the St. Louis World's Fair as one of the jurors on awards for civil and marine engineering, models, plans and designs for public works and architectural engineering. Mr. Wheeler has been in the Detroit engineering districts since 1882. During 1898 and 1899 he was detailed as chief engineer to the Nicaraguan commission.

YACHTING.

A meeting of representatives of southern California yacht clubs was held at the Corinthian Yacht Club's headquarters at San Diego during the latter part of last month for the purpose of forming a Pacific coast yacht racing association.

The Detroit, sailing under the flag of the San Diego Yacht Club, won the Sir Thomas Lipton challenge cup on Aug. 23 and 24. The entries were the Detroit, Marie, Mischief, Venus and Estrella. On the 23rd the Detroit won over the Marie, the second yacht to cross the line, by 12 minutes, 42 seconds. On the 24th the Detroit won over the Mischief by 6 minutes and 6 seconds. All time allowances have been figured in these totals. The races were sailed off Coronado beach according to Sir Thomas Lipton's deed of gift.

The bureau of navigation of the treasury department has answered in the affirmative to a question propounded by the customs division whether United States vessels engaged in trading between San Francisco and Ancon, but touching at Mexican ports, would be considered as engaged in the foreign trade. Categorically the reply was that so far as Mexican ports are concerned such vessels would unquestionably be engaged in the foreign trade. This, it is said at the treasury department, does not settle the question whether Ancon is or is not in the Panama zone, an interpretation given to it in some quarters.

The steamer John Ericsson of the Pittsburg Steamship Co.'s fleet, bound for Comeaut with a cargo of ore, went ashore in Lake Erie near Madison, O., this week. She was going at a good rate of speed at the time, but as far as could be discovered is not seriously damaged. Tugs were sent to the stranded boat from Fairport and Ashtabula. Capt. C. H. Sinclair, general manager of the Great Lakes Towing Co., will have charge of the wrecking work.

Information from Washington is to the effect that luxury will be sacrificed for formidableness in the new armored cruisers, the plans for which are now undergoing consideration by the bureau of construction. The watertight subdivision will be made complete and there will be no piercing of bulkheads by ventilating pipes or other openings. The purpose is to offer the greatest resistance to torpedo attack.

W. A. Boole & Son, Oakland, Cal., are building a gasoline schooner for the South sea trade of Williams, Dimmond & Co. of San Francisco. The schooner will measure 100 ft. in length, 26 ft. mean and 10 ft. depth.

ITEMS OF GENERAL INTEREST.

Thomas S. Marvel, Newburg, N. Y., recently launched a barge 150 ft. long, 27 ft. beam and 10 ft. deep for the J. M. Guffey Petroleum Co. of Pittsburg.

It is reported that neither Mr. George L. Watson nor Mr. Wm. Fife will design another challenger for the America's cup. Mr. Watson has designed four challengers for this trophy.

The new boat built for the fish and game commission of Massachusetts was launched at the navy yard of Murray, Tregurtha & Co., South Boston, last week. The launch is 42 ft. over all and 8½ ft. beam.

The White Star liner Baltic, the largest vessel in the world, bore a small city on her latest trip to New York. She had 2,060 persons in the steerage, 671 in the cabins and 393 in the crew, making a total on board of 3,124 persons.

The Pacific Mail Steamship Co., San Francisco, and the Portland & Asiatic Steamship Co., Portland, Ore., announce that beginning with Sept. 1 they are prepared to resume receiving freight destined for Japan, Korea and China.

The North German Lloyd steamer Kaiser Wilhelm II has broken her own westward passage by 2 hours and 26 minutes, making the time of passage 5 days, 12 hours and 44 minutes. Her best previous time westward was 5 days, 15 hours and 10 minutes.

The four-masted schooner Charles E. Wilbur was launched from the ship yard of M. B. McDonald & Son, Mystic, Conn., last week. She is of a baldheaded type, having no topmasts, and is 175 ft. long, 36 ft. beam and 13½ ft. deep.

Charles M. Schwab was reported last week as saying that the Bethlehem Steel Co. will be operated in the future as a part of the United States Ship Building Co. and that he expected to see a revival in ship building at the close of the presidential campaign.

It is understood that Rear Admiral Henry M. Manney, chief of the bureau of equipment, will request an appropriation of \$300,000 for the installation of wireless telegraphic apparatus in his department. His report will deal extensively with this new method of communication.

Mr. Lewis Nixon of the Crescent Ship Yard, Elizabethport, N. J., returned from St. Petersburg and says that there will be quiet a revival of ship building in the United States this fall. While Mr. Nixon did not say so, he seemed to infer that the American ship yards would have a share in the work of rehabilitating the Russian navy.

The property of the Mariners' Construction & Dry Dock Co. Marine Harbor, Staten Island, New York, will be sold by William J. Burlee, trustee, at public auction on Sept. 15. The estate consists of ship building docks, marine railways, with the necessary machinery for operating the plant. The sale is subjected to a first mortgage of \$39,270.70.

The cruiser Minneapolis in her recent speed trial with the Columbia and the Prairie from Newport, R. I., to Hampton Roads made an average speed of 20.4 knots during the entire trip, beating the Columbia by three minutes. The Minneapolis and the Columbia are sister ships and were built by Cramp's, Philadelphia. They are 412 ft. long, 58 ft. 2 in. beam and have a mean draught of 22 ft. 6 in.

The Japanese ships Makasa, Ashai, Yakumo, Adzumo and Idzume now engaged in the Japanese-Russian war are all reported as steaming well and fast and that their Belleville boilers had given them no trouble whatever. Of the Russian ships the Bayan, Gromoboi, Rossia and Askold are all in good steaming condition. Of these ships all have Belleville boilers with the exception of the Askold which has Thornycroft.

There are now two complete submarine cables between

Germany and the United States. The second cable from Borkum to New York, via the Azores, has been completed. It was laid by the cable steamer Stelhan, which left New York on May 10 with 2,100 nautical miles of cable on board. She commenced to play out on May 11 from a point off Fire island. The cable was manufactured at Nordunham, Germany, by the Norddeutsche Seekabelwerke.

The Seamless Steel Tubes Co. of Detroit, Mich., has recently been reorganized and renamed, and will, in future, be known as the Detroit Seamless Steel Tubes Co. This company makes a specialty of cold drawn seamless steel locomotive flues, and stationary boiler tubes, which are rapidly growing in favor; and the seamless flue is fast becoming standard on the railroads of the United States. Plans are now being prepared for large additions to their plant to meet the increasing demand for their product.

The Burt & Mitchell Co. operating a dry dock and ship yard at the foot of Morris street, Jersey City, N. J., announce that at a special meeting of the directors of the company William Brown was elected president. Mr. Brown, who was formerly senior member of the firm of Brown & Miller, purchased the stock of Walter Burt and the estate of John W. Mitchell in the company. The company has erected a modern machine and blacksmith shop and has installed new and up-to-date tools and are fully equipped for handling repair work generally. The lifting capacity of their dry dock is 1,000 tons.

The new steel hull river steamboat Swan was launched from the ship yard of the Merrill-Stevens Engineering Co., Jacksonville, Fla., recently. The new vessel is being built for Capt. W. T. Gibson of Savannah and will be used on the Savannah river. The Swan is 156 ft. over all, 34 ft. wide and 5 ft. depth amidships. She will have two 12 by 60 in. paddle engines turning a single stern wheel with diagonal buckets 15 ft. in diameter by 20 ft. wide, steam being supplied by two Scotch boilers. The steamer will draw 16 in. of water when completed. She will have two upper decks for passengers and freight and her cost will be about \$25,000.

The Maritime Board of Trade of Toronto has adopted resolutions asking the Canadian government to use its influence with the imperial government to have such treaties with several of the European governments as would interfere with the coastwise trade annulled. The board holds that the substitution of steel instead of wood construction in ships reduced Canada from the fourth to an unimportant place among the ship building nations and that the construction of steel vessels is prohibited in the dominion by reason of the skill and capacity employed in British ship yards, the products of which are permitted to compete in the coastwise and foreign trade. The board approved of the proposition of home ship building as a profitable field for the utilization of the natural products of the dominion as well as affording a profitable field for the employment of skilled labor in Canada.

The Canadian customs department has promulgated regulations to the end that what is known as dumping may be stopped in the dominion. The anti-dumping clause is certainly an original and striking idea in tariff making. To state it briefly the Canadian parliament provides that in any case where imported dutiable goods of a class or kind manufactured in Canada, whether subject to specific or ad valorem duties, are sold to Canada at a price below the fair market value of such goods as sold for home consumption in the open market of the country of export, there shall be levied thereon in addition to the ordinary duty established by the customs laws a special duty equal to the difference between the selling price to Canada and the fair market value for home consumption in the country of export. It is provided, however, that the special duty shall not exceed one-half the ordinary duty provided by law.

NEW CHARTS.

Following is the list of latest charts issued by the British admiralty and sold by J. D. Potter, admiralty chart agent, 145 Minories, London:

- Scotland, west coast. Hebrides, Lewis:—West Loch Roag.
 Ireland, south coast:—Queenstown.
 Baltic sea. Gulf of Bothnia:—Approaches to Ralsö and Björneborg.
 France, west coast:—Approach to Brest.
 Black sea, plans:—Kustenhjeh (Constanta) anchorage. Bender Ereklî.
 Newfoundland, east coast. Bay of Exploits:—Peter arm.
 North American lakes. Lake Huron:—St. Clair river to Goderich (Plan:—Goderich harbor.)
 South America. Tierra del fuego. Beagle channel:—Cape San Pio to Gable island.
 South America. Tierra del fuego. Beagle channel:—Gable island to Lapataia bay.
 Philippine islands. Plans on the north coast of Mindanao:—Port Misamis. Port Langaran.
 Cochín China:—Saigon or Don nai river.
 China, north coast:—Peiho or Peking river, Sheet I, from the entrance to Ko-ku (Reproduction).
 Japan. Plans on the south coast of Yezo:—Fukuyama byochi. Fukushima byochi.
 Ireland, east coast. Approaches to Wexford harbor. Plan added:—Rossaire harbor.
 Sicily. Plans of anchorages on the west coast. Plan added:—Sciacca.
 Ireland. Plans on the west coast. Plans added:—Budir Krossvik.
 West Indies. Haiti or San Domingo. Approaches to Port au Prince. Plan added:—Jeremie bay.
 Alaska. Anchorages in southeast. Plan added:—Yes bay.
 Eastern archipelago. Harbors and anchorages between Bali and Timor. Plan added:—Sermata, west point.
 Eastern archipelago. Selabu, west coast. Plan added:—Warain road.
 Sulu sea. Anchorages in Gillolo. Plans added:—Ekor and Gafela roads. Bobani bay and Pasir Putih anchorage.
 Philippine islands. Plan added:—Port San Vicente.
 China, east coast. Harbors and anchorages on the coast of Formosa. Plan added:—Taihanroku anchorage.
 Korean archipelago. Port Hamilton. Plan added:—U-to anchorage.
 New Zealand. Ports Lyttleton and Levy. New plan:—Lyttleton harbor.
 New Zealand. Sheet XIV. Plan added:—Greymouth harbor.
 South Pacific ocean. Harbors and anchorages in the Sandwich islands. Plan added:—Kaanapali anchorage.

Charts that have received additions or corrections too large to be conveniently inserted by hand, and in most cases other than those referred to in the Admiralty Notices to Mariners:

- 1028 England, south coast:—Dover bay.
 1185 England. River Thames:—Sea reach.
 2030 Ireland, southwest coast:—Valentia harbor.
 1128 Norway. Nevlunghavn to Torbiørnskiær.
 3159 Norway. Torbiørnskiær to Jæloen.
 3160 Norway. Torbiørnskiær to Rauo.
 1207 Norway. Lepso to Ona.
 1208 Norway. Approaches to Molde.
 2307 Norway. Sheet V.: Smølen to Sves fiord.
 2315 Norway. Sheet XIII.: Soro to North Cape.
 2316 Norway. Sheet XIV.: North cape to Tana fiord.
 2331 Baltic. Gulf of Finland:—Hango head to Baro sound.
 1458 Spain, east coast. Ports and anchorages.

- 2740 Iceland and the Færoe islands.
 505 Iceland, western portion.
 506 Iceland, eastern portion.
 3017 North American lakes. Duluth and Superior harbors.
 2538 Nova Scotia. Bay of Fundy. Yarmouth to Petit passage.
 2488 United States, east coast:—Portland harbor.
 2580 West Indies. Cuba, eastern portion.
 2600 West Indies:—San Domingo to Dominica.
 1501 Alaska. Aleutian islands:—Seguam island to Attu island.
 1064 Madagascar. Plans on the northeast coast.
 40 India, west coast:—Karachi harbor.
 859 Bay of Bengal. Mutlah river to Elephant point.
 934 Eastern archipelago. Surabaya, etc.
 3349 Cochín China. Approach to Kwang chau wan.
 3386 China, east coast. Long harbor and approaches.
 166 China, east coast:—Pagoda anchorage.
 372 Japan. Kiusiu, west coast:—Gulf of Kagosima, upper part.
 764 New Guinea, etc. New Hanover. New Ireland and New Britain.
 2527 New Zealand. Sheet III.: Mayor island to Poverty bay.
 2411 New Zealand:—Otago harbor.
 1013 New Hebrides. Malekula, northern part.
 1579 New Hebrides. Malekula, southern part.

TRADE NOTES.

The American Steel & Wire Co. of Cleveland have just issued a little circular giving list prices on steel and copper wire on spools. It can be had for the asking.

The Atlantic Works, Inc., Philadelphia, recently shipped to McKay & Dix, Bucksport, Me., one of their B 17 adjustable bevel band sawing machines for use in their Verona Island ship yard.

The Edson Mfg. Co. has recently issued a postal card giving the calendar for the month of September and incidentally advertising their steering wheels and gears, ship bells, capstans and winches.

J. W. Farr, 120 West Jackson boulevard, Chicago, has patented an electric sounding apparatus, the purpose of which is to take soundings from ships whether in motion or standing still. An electric bell rings when the sinker touches bottom and the crescent pointer designates on the dial the exact depth of water in fathoms.

Horace See, 1 Broadway, New York, has issued his 1904 edition entitled "Sea Specialties." It is a very neatly printed volume containing photographs of a number of battleships and liners, together with a description of the various specialties designed by Mr. See. It also includes a description of a variety of specialties for ships made by other manufacturers.

The International Specialty Co., 346 Holden avenue, Detroit, Mich., has just placed upon the market the semi-diamond emery wheel dresser. This dresser is for use on all wheels used for tool grinding except water grinders. For water grinders it is not recommended as a black diamond is better for such class of work. However, the company represents that on tool grinding wheels it is better than black diamond.

The B. F. Sturtevant Co. is fitting up quarters in its big plant to be used for an emergency hospital in case of accident to employees. It is to be equipped with all the appliances known to medical and surgical science for the proper care of the men who may get injured in the discharge of their duties until they can be removed to their homes. A graduate nurse and medical student will be in charge and a local doctor will attend to all surgical cases.

The Nicholson Ship Log Co., Cleveland, O., has placed upon

the market a very simple device known as the Nicholson Tell Tale. It is placed where the captain can conveniently see it from the bridge and is electrically connected with the engine that drives the ship. It automatically indicates on the dial, which is electrically lighted for night work, whether the engine is going ahead, astern or when it stops. The value of this device to the captain is, of course, beyond question.

The September issue of Graphite issued by the Joseph Dixon Crucible Co., Jersey City, N. J., is a special number and contains instructive and sensible thoughts in the preservation of metal surface with Dixon's silica-graphite paint. Paint specifiers and users will undoubtedly be interested in the excellent illustrations in half tones of notable steel structures and the information on good paint and good painting given in the number. The publication will be sent free of charge upon request to any one interested.

That the B. F. Sturtevant Co. of Boston, who have recently moved to their new office and works at Hyde Park, Mass., are to press the sale of their economizers is evidenced by the new economizer catalogue which they have recently issued. This catalogue contains the details of the Sturtevant standard and pony types of economizers in comparison with those of other makes, the advantages, sizes, weights, accessibility, repairing, etc. It also treats of the subject of mechanical draft and natural draft and is of interest to all steam users. It may be obtained by anyone interested in the subject.

The Borden & Sellick Co., 48-50 Lake street, Chicago, have just issued a catalogue devoted to their freight handling machinery for carrying and elevating boxes, barrels, bales and packages. The catalogue is illustrated with photographs, wash and line drawings of various devices designed and manufactured by this company. They have been especially successful in designing machinery for unloading vessels. The company is prepared to furnish estimates and preliminary drawings upon receipt of a rough sketch showing the requirements. Not only are plans and working drawings furnished but a competent millwright is sent along to superintend the construction of machinery, if desired.

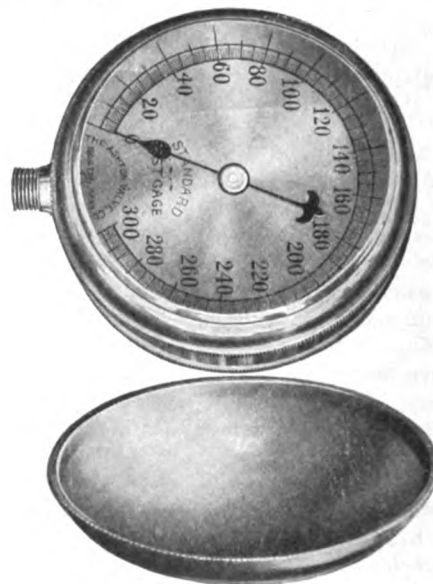
The Abner Doble Co., San Francisco, Cal., have issued in pamphlet form the thesis by H. C. Crowell and G. C. D. Lenth upon the investigation of the Doble regulating nozzle. The thesis is printed by permission of the civil engineering department of the Massachusetts Institute of Technology of Boston. The stream thrown from the Doble nozzle is clear, transparent and polished with a total absence of spraying in the proximity of the trip which is a common fault with nozzles. It would be practically impossible to give the gist of this thesis without publishing the whole of it but the Doble company will send it to anyone interested. The thesis is illustrated with various photos of streams thrown from nozzles.

The steamer Monitor was launched at Boston recently and was named by Marie Collins, the youngest daughter of the mayor. The new steamer, which is to take the place of the J. Putnam Bradlee, will be quite a valuable addition to the fleet of boats at Boston harbor. Her dimensions are: Length over all, 155 ft. 4 in.; keel, 148 ft.; beam, 26 ft.; beam over guards, 45 ft. 10 in.; depth of hold, 9 ft. 3 in.; draught, normal, 5 ft. 7 in. The steamer is being built by the Lockwood Manufacturing Co., although numerous small contracts have been sublet. The launch occurred at the wharf of the Atlantic Works, East Boston.

At the meeting of the board of managers of the Lumber Carriers' Association at Detroit this week better demand was noted for lumber tonnage, but no change in the rate was suggested. So far this season 125 boats employed in the lumber trade have laid up for one trip in order to give firmness to the market.

ASHTON POCKET TEST GAUGE

There has long been a demand for a neat, light and accurate test gauge of a suitable size and so constructed that it could be



carried in the pocket or handbag without danger of injury. The Ashton standard pocket test gauge shown in the accompanying cut is particularly designed to meet these requirements, being made with a bevel plate glass front and fitted with a cover to insure perfect protection. It is much appreciated and largely used by many air brake inspectors, boiler inspectors, master mechanics and chief engi-

neers. This standard test gauge, like all other Ashton gauges, is made with a spring of solid-drawn seamless tubing, non-corrosive movement and is the best that high grade material and skilled workmanship can produce. It is made in a 3-in. size, graduated for any pressure up to and including 500 lbs., with full nickel plate and weighs, complete with cover, about 1 lb. This useful instrument which if properly used will last a lifetime is made by the Ashton Valve Co., 271 Franklin street, Boston, Mass.

The Hamburg-American Steamship Co. have concluded that among the best ocean travelers there is a constantly increasing number who attach no paramount importance to speed, but who give the preference to steamers which by arrangements, equipment and build will render the stay on board most comfortable and the voyage as little dependent as possible on the state of the weather. This company are at present having a 17-knot steamer built by Harland & Wolff, Belfast, intended to fulfill these requirements. She will be of 22,500 tons (the largest in the fleet) and will be named America.

As illustrating the depression in ocean traffic it may be noted that there are no fewer than ten Union-Castle liners on the laid-up list at Southampton. Eight are moored down the river while the Dunvegan Castle has been taken off the service and berthed in the inner dock to make room for the new Kenilworth Castle loading for the Cape. The Harlech Castle on arriving from the Cape is also to be laid up.

The steamer Abercorn, which has sailed the great lakes for thirty years and which was used in the coal trade between Sandusky and Windsor, was burned at Goderich, Ont., on Labor day while unloading a cargo of coal. The fire was caused by the explosion of one of her signal lamps. The Abercorn was 126 ft. long, 26 ft. beam and 11 ft. deep. She was owned by Capt. W. J. Willoughby and Richard Baxter, engineer.

Mr. Allan J. Cameron, engineer of the car ferry Michigan, at Windsor, died on Thursday. The deceased was well known on the upper lakes, having been engineer on the steamer Alberta and other vessels for many years. The funeral took place at Owen Sound from the residence of his son, Mr. Angus A. Cameron.



VOL. XXX.

CLEVELAND, O., SEPT. 8, 1904.

No. 10

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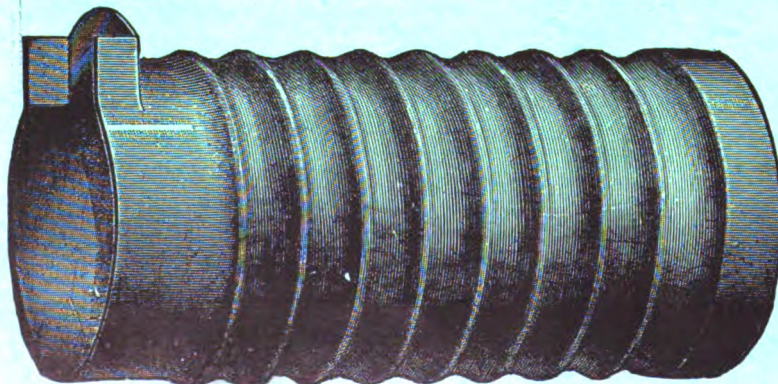
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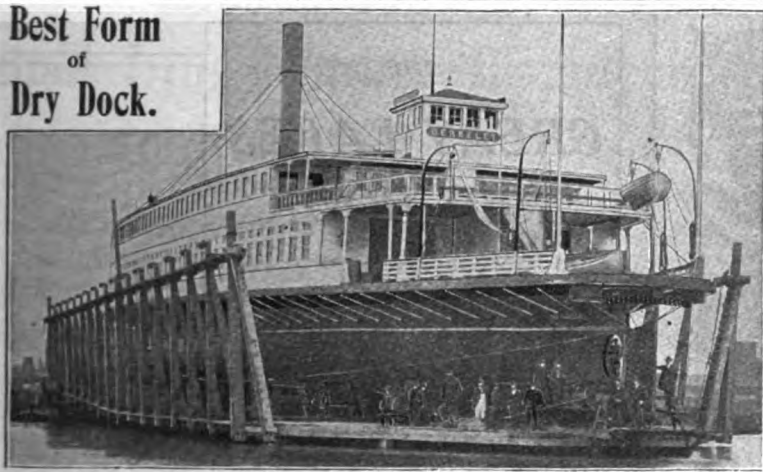
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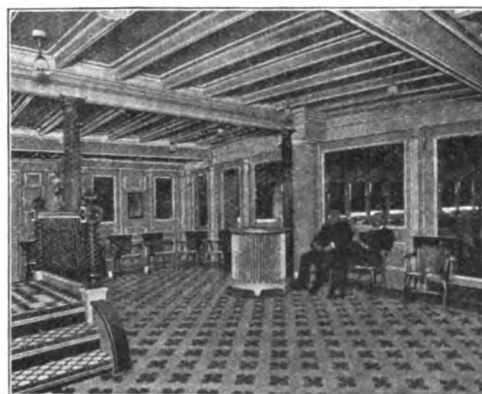
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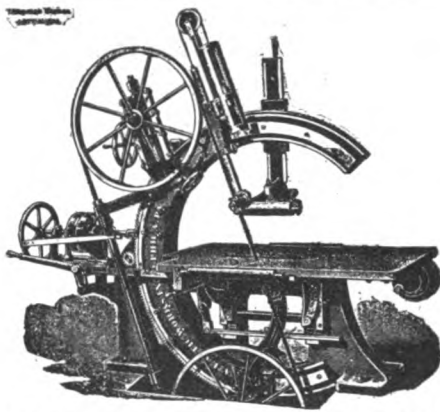
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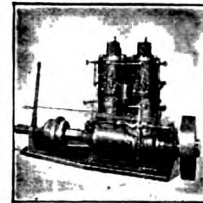
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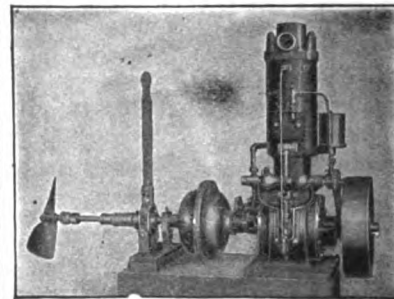
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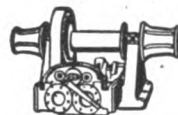
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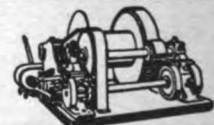
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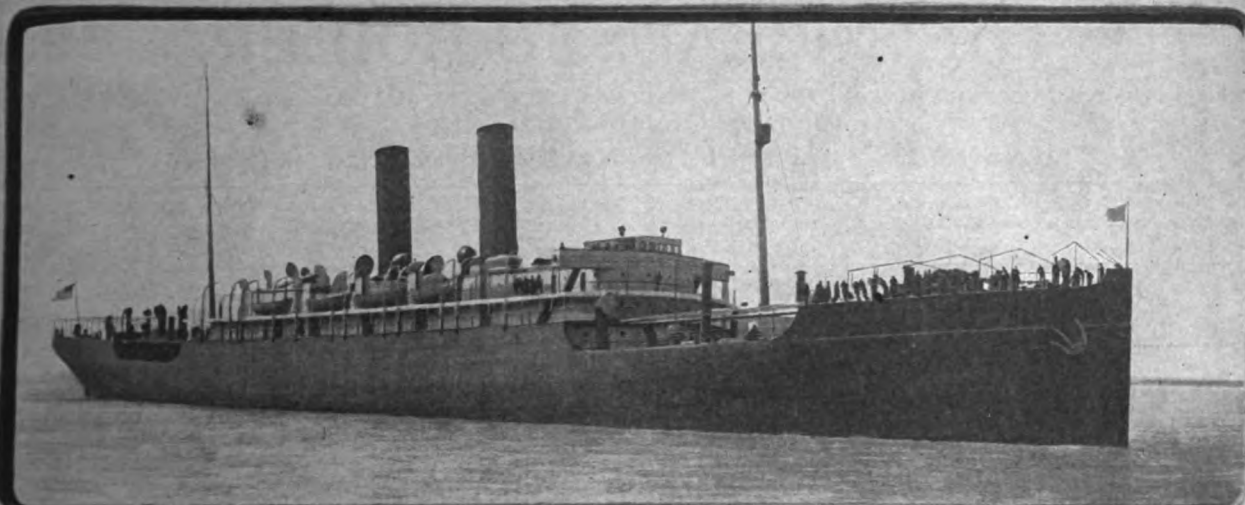
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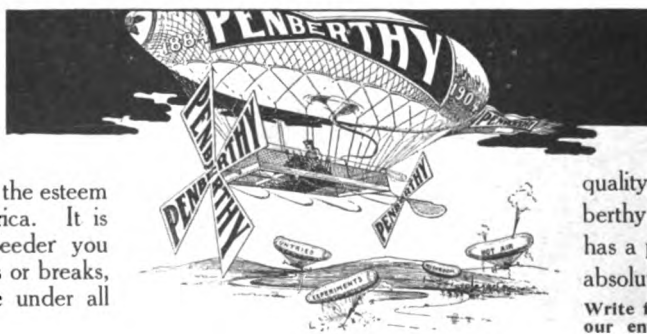
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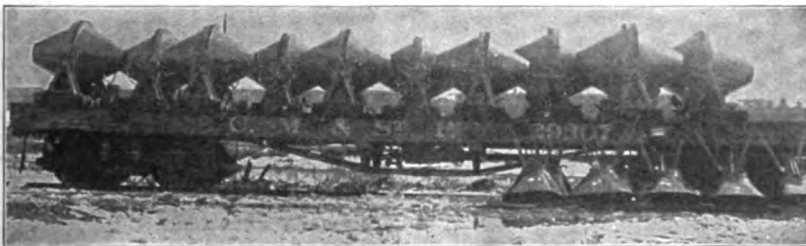
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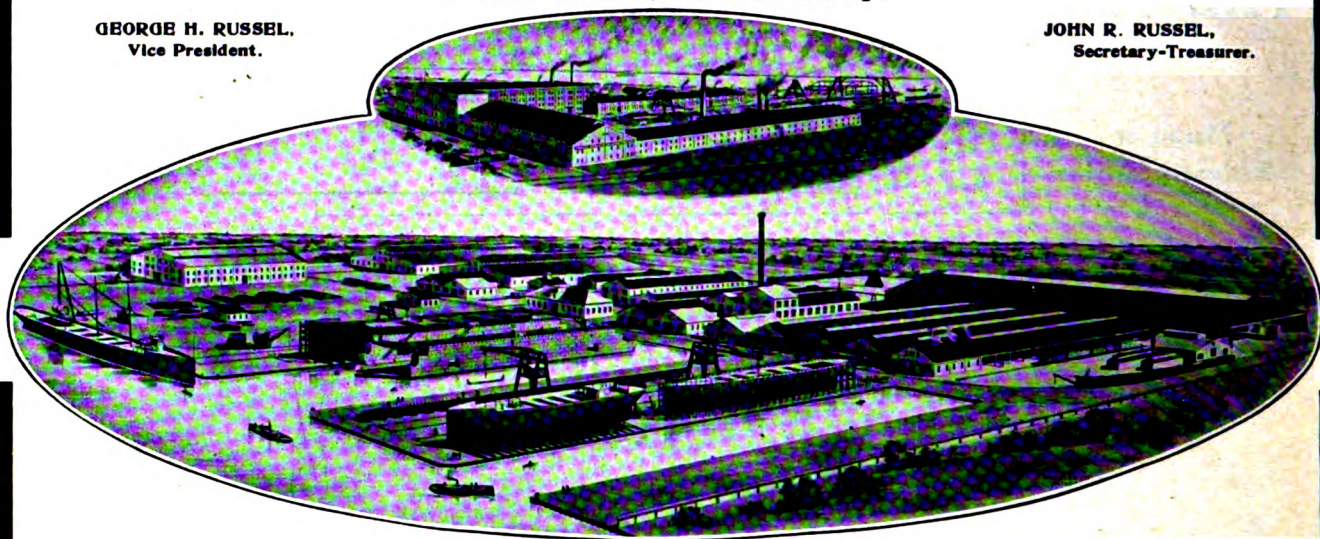
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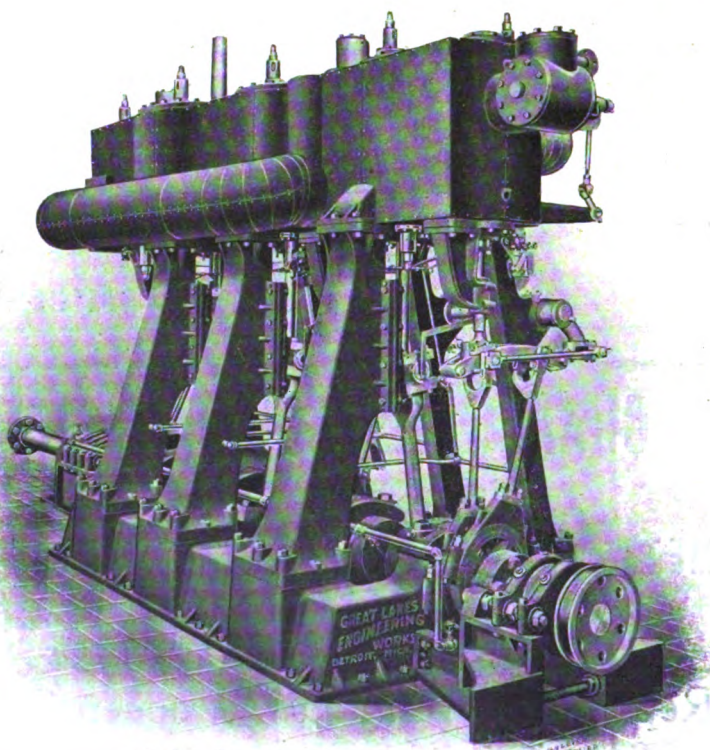
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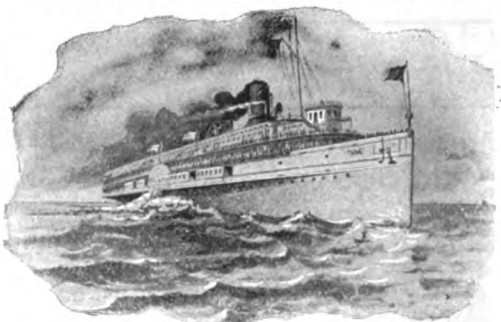
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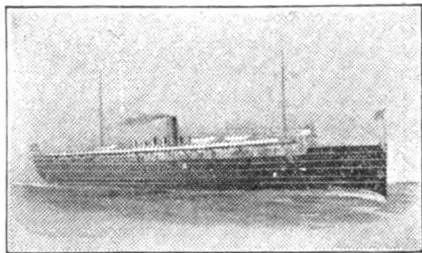
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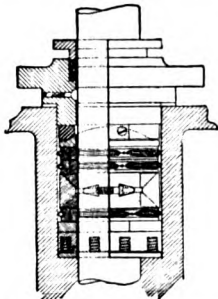


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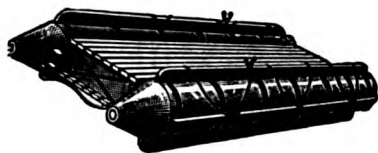
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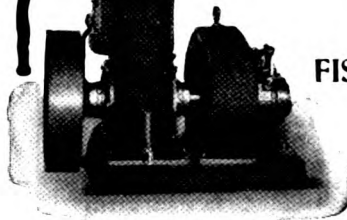
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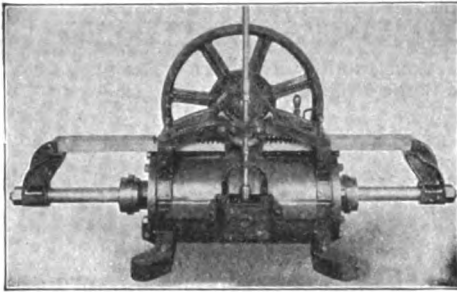
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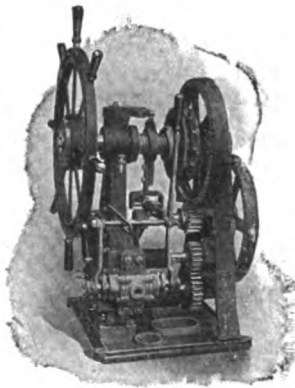
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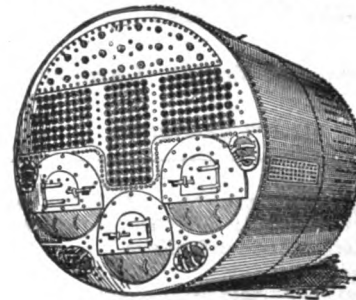
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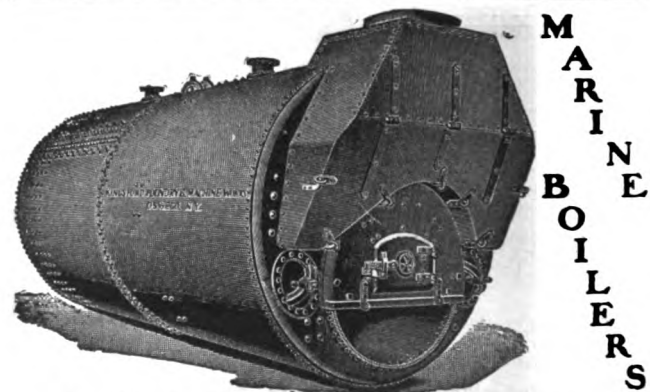
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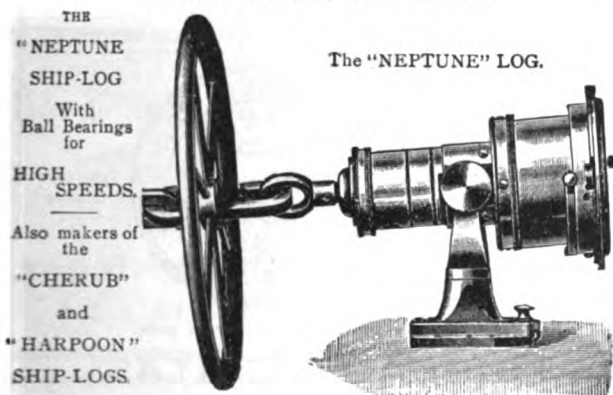
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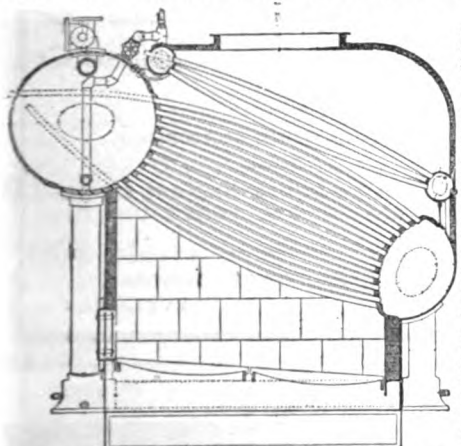
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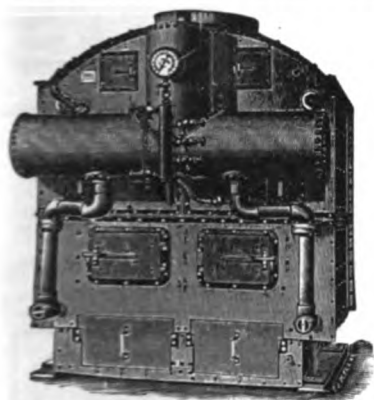
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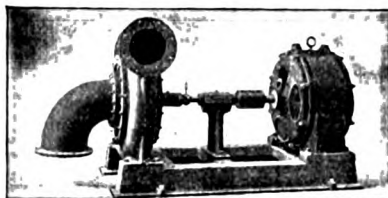
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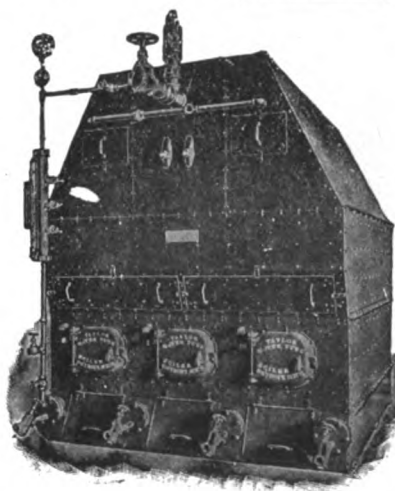
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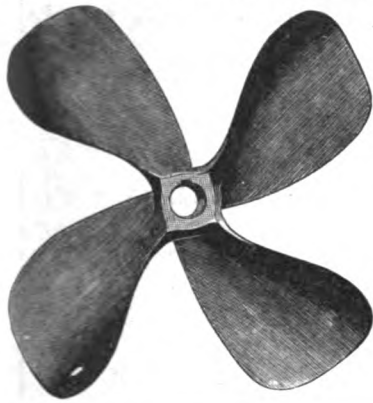
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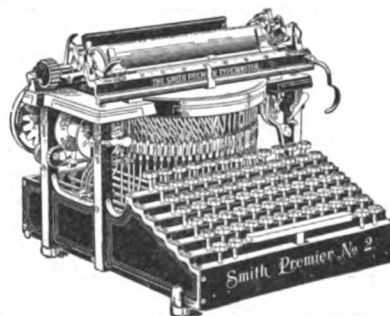
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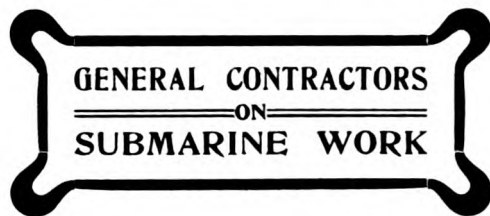
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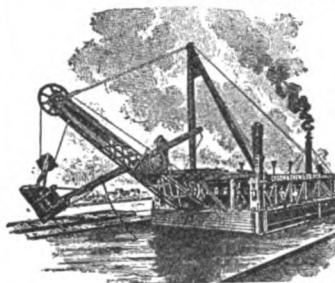
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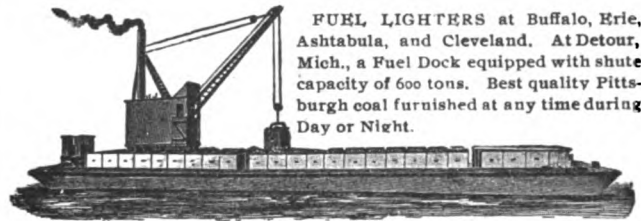
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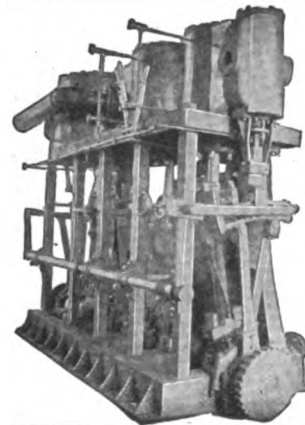
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Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

CEMENT, IRON FOR REPAIRING LEAKS.

Smooth-On Mfg. Co.....Jersey City, N. J.

CHAINS.

Lebanon Chain Works.....Lebanon, Pa.

CHAIN HOISTS.

Boston & Lockport Block Co.....Boston, Mass.
Dake Engine Co.....Grand Haven, Mich.

CHARTS.

Marine Review Pub. Co.....Cleveland.
Potter, J. D.....London.

CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.

Ashton Valve Co.....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.
Standard Gauge Mfg. Co.....Syracuse, N. Y.

COAL PRODUCERS AND SHIPPERS.

Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.

COAL AND ORE HANDLING MACHINERY.

Brown Hoisting Machinery Co. (Inc.) ..
Cleveland.
Macbeth Iron Co.....Cleveland.

COMPASSES.

Ritchie, E. S. & Sons.....Brookline, Mass.

COMPOSITIONS FOR SHIP'S BOTTOMS.

Holzappel's American Compositions Co.....New York.

CONCRETE MIXERS.

Contractors Supply & Equipment Co.....Chicago.

CONDENSORS.

Great Lakes Engineering Works.....Detroit.
Thropp & Sons Co., John E.....Trenton, N. J.

CONTRACTORS SUPPLIES.

Contractors Supply & Equipment Co., Chicago.

CONTRACTORS FOR PUBLIC WORKS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co.....
Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Lake Superior Contracting & Dredging Co.....
Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee.
Sullivan, M.....Detroit.

CORDAGE.

Baker & Co., H. H.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.

Armstrong Cork Co.....Pittsburg, Pa.
Kahnweiler's Sons, D.....New York.

COURSE FINDER.

Field's Patent Course Finder.....Cleveland.

CHAIN CONVEYORS, HOISTS.

Brown Hoisting Machinery Co. (Inc.).....
Cleveland.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.....
Pittsburg, Pa.

CRANES, TRAVELING.

Brown Hoisting Machinery Co.....Cleveland.
Pawling & Harnischfeger.....Milwaukee.

DIVING APPARATUS.

Morse, A. J. & Son.....Boston.
Schrader's Son, A.....New York.

DREDGING CONTRACTORS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co.....
Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Hickler Bros.....Sault Ste. Marie, Mich.
Lake Superior Contracting & Dredging Co.....
Duluth, Minn.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee.
Sullivan, M.....Detroit.

DRYING APPARATUS.

Bayley & Sons Co., Wm.....Milwaukee, Wis.
Sturtevant, B. F., Co.....Hyde Park, Mass.

DRY DOCKS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....
Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
United States Ship Building Co.....New York.

Buyers' Directory of the Marine Trade.—Continued.

ELECTRIC HOISTS AND CRANES.

Fisher Electrical Works..... Detroit.
General Electric Co..... Schenectady, N. Y.
Fawing & Harnischfeger..... Milwaukee.
Westinghouse Electric & Mfg. Co.....
Pittsburg, Pa.

ELECTRIC LIGHT AND POWER PLANTS.

Fisher Electrical Works..... Detroit.
General Electric Co..... Schenectady, N. Y.
Metz, Aug..... New York.
Sturtevant, B. F. Co..... Hyde Park, Mass.
Thrupp & Sons, John E..... Trenton, N. J.
Westinghouse Electric & Mfg. Co.....
Pittsburg, Pa.

ENGINE BUILDERS, MARINE.

American Ship Building Co..... Cleveland.
Atlantic Works..... East Boston, Mass.
Bertram Engine Works Co., Ltd..... Toronto, Can.
Chicago Ship Building Co..... Chicago.
Cise Machine Co..... Cleveland.
Camp, Wm. & Sons..... Philadelphia.
Craig Ship Building Co..... Toledo, O.
Lake Engine Co..... Grand Haven, Mich.
Lambert Ship Building Co..... Detroit.
Hecker, W. & A. Co..... Hoboken, N. J.
Fox River Ship & Engine Co..... Quincy, Mass.
Great Lakes Engineering Works Detroit, Mich.
Hall Bros..... Philadelphia.
Jenks Ship Building Co..... Port Huron, Mich.
Lockwood Mfg. Co..... East Boston, Mass.
Macbeth Iron Co..... Cleveland.
Metz, Aug..... New York.
Milwaukee Dry Dock Co..... Milwaukee.
Moser, Chas. D..... New York.
Mushon Steering Engine Co..... New York.
Newport News Ship Building Co.....
Newport News, Va.
Northwestern Steam Boiler & Mfg. Co.....
Duluth, Minn.
Reich's Ship Yard..... Chester, Pa.
Stedds Mfg. Co..... Milwaukee.
Superior Ship Building Co..... Superior, Wis.
Thrupp, J. E. & Sons Co..... Trenton, N. J.
Trent, H. G..... Buffalo.
United States Ship Building Co..... New York.
Willard, Chas. P. & Co..... Chicago.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Gry, Chas. & Son..... New York.
Manne Mfg. Supply Co..... New York.

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co..... Chicago.
Kiley & Mueller..... New York.
Lunkenheimer Co..... Cincinnati.
New York Belting & Packing Co..... New York.
Northwestern Steam Boiler & Mfg. Co.....
Duluth, Minn.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Hynd, Alexander..... Cleveland.
Hunt, Robt. W. & Co..... Chicago.
Kidd, Joseph..... Duluth, Minn.
Lewey, H. O..... Buffalo.
Mason & Drake..... Philadelphia.
Moser, Chas. D..... New York.
Nesey, James..... Cleveland.
Pittsburg Testing Laboratory, Ltd..... Pittsburg.
Roe, Henry..... Buffalo.
Recker, H. B..... New York.
Saffer, Perkins & Field..... New York.
Swel, Adam..... Cleveland.
Wood, W. J..... Chicago.

FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co..... Hyde Park, Mass.

FEED WATER PURIFIERS AND HEATERS.

Kiss Valve Co..... Troy, N. Y.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co..... Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.....
Pittsburg, Pa.

FORGES.

Sturtevant, B. F. Co..... Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co..... Cleveland.
Fox River Ship & Engine Co..... Quincy, Mass.
Macbeth Iron Co..... Cleveland.

FLUE WELDING.

Fix's, S. Sons..... Cleveland.

FUEL ECONOMIZERS.

Sturtevant Co., B. F..... Hyde Park, Mass.

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co..... Cleveland.
Ironville, Dock & Coal Co..... Toledo, O.
Parker Bros. Co., Ltd..... Detroit.
Picklands, Mather & Co..... Cleveland.
Pittsburg Coal Co..... Cleveland.
Smith, Stanley B., & Co..... Detroit.
Smith Coal & Dock Co., Stanley B. Toledo, O.

FURNACES FOR BOILERS.

Continental Iron Works..... New York.

GASKETS, RUBBER.

New York Belting & Packing Co..... New York.

GAS BUOYS.

Safety Car Heating & Lighting Co..... New York.

GAS AND GASOLINE ENGINES.

Chase Machine Co..... Cleveland.
Georgian Bay Engineering Works.....
Midland, Ont.
Reliance Mfg. Co..... City Island, New York.
Temple Pump Co..... Chicago.

GAUGES, STEAM AND VACUUM.

American Steam Gauge & Valve Mfg. Co.....
Boston.
Ashton Valve Co..... Boston.
Lunkenheimer Co..... Cincinnati.
Standard Gauge Mfg. Co..... Syracuse, N. Y.

GAUGES, WATER.

Bonner & Co., Wm. T..... Boston.
Lunkenheimer Co..... Cincinnati, O.
Standard Gauge Mfg. Co..... Syracuse, N. Y.

GRAPHITE.

Dixon Crucible Co., Joseph..... Jersey City, N. J.

HAMMERS, STEAM.

Chase Machine Co..... Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co..... Hyde Park, Mass.

HOISTS FOR CARGO, ETC.

American Ship Building Co..... Cleveland.
Brown Hoisting Machinery Co. (Inc.).....
Cleveland.
Chase Machine Co..... Cleveland.
General Electric Co..... New York.
Georgian Bay Engineering Works.....
Midland, Ont.
Hyde Windlass Co..... Bath, Me.
Marine Iron Co..... Bay City.
Mietz, Aug..... New York.
Pawling & Harnischfeger..... Milwaukee.
Westinghouse Electric & Mfg. Co.....
Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co..... Cuyahoga Falls, O.

HOSE, RUBBER.

New York Belting & Packing Co..... New York.

HYDRAULIC DREDGES.

Great Lakes Engineering Works..... Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The..... New York.

ICE MACHINERY.

Great Lakes Engineering Works..... Detroit.
Roelker, H. B..... New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co..... Boston.
Ashton Valve Co..... Boston.

INJECTORS.

American Injector Co..... Detroit.
Crane Co..... Chicago.
Jenkins Bros..... New York.
Lunkenheimer Co..... Cincinnati.
Penberthy Injector Co..... Detroit, Mich.

INSURANCE, MARINE.

Elphicke, C. W. & Co..... Chicago.
Fleming & Co., P. H..... Chicago.
Frankfort Marine, A. & P. G. Ins. Co.....
New York.

INSURANCE, MARINE—Continued.

Gilchrist & Co., C. P..... Cleveland.
Hawgood & Co., W. A..... Cleveland.
Helm & Co., D. T..... Duluth.
Hutchinson & Co..... Cleveland.
McCarthy, T. R..... Montreal.
McCurdy, Geo. L..... Chicago.
Mitchell & Co..... Cleveland.
Parker Bros. Co., Ltd..... Detroit.
Peck, Chas. E. & W. F. New York & Chicago.
Prindiville & Co..... Chicago.
Richardson, W. C..... Cleveland.
Sullivan, D. & Co..... Chicago.
Voss, F. D..... New York.

IRON ORE AND PIG IRON.

Bourne Fuller Co..... Cleveland, O.
Hanna, M. A. & Co..... Cleveland.
Pickands, Mather & Co..... Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Georgian Bay Engineering Works.....
Midland, Ont.
Marine Construction & D. D. Co.....
Mariner's Harbor, S. L., N. Y.
Truscott Boat Mfg. Co..... St. Joseph, Mich.
Willard, Chas. P..... Chicago.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong, Cork Co..... Pittsburg.
Drein, Thos. & Son..... Wilmington, Del.
Kahnweiler's Sons, D..... New York.

LIGHTS, SIDE AND SIGNAL.

Russell & Watson..... Buffalo.

LOGS.

Walker & Sons, Thomas..... Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph..... Jersey City, N. J.

LUBRICATORS.

Crane Co..... Chicago.
Lunkenheimer Co..... Cincinnati.

LUMBER.

Martin-Barriss Co..... Cleveland.

MACHINISTS.

Chase Machine Co..... Cleveland.
Gogebic Steam Boiler Works..... Duluth, Minn.
Hickler Bros..... Sault Ste. Marie, Mich.
Lockwood Mfg. Co..... East Boston, Mass.
Macbeth Iron Co..... Cleveland.
Union Machine & Boiler Co..... Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc..... Philadelphia.

MARINE RAILWAYS.

Hickler Bros..... Sault Ste. Marie, Mich.

MARINE GLUE.

Ferdinand & Co., L. W..... Boston, Mass.

MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I..... East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W..... New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co..... Cleveland.
Detroit Ship Building Co..... Detroit.
Great Lakes Engineering Works..... Detroit.
Sturtevant, B. F. Co..... Hyde Park, Mass.

MELTING POT AND PAYING LADLE.

(For Paying Seams of Decks with Marine Glue.)
Ferdinand & Co., L. W..... Boston.

METALLIC PACKING.

Katzenstein, L. & Co..... New York.

METAL POLISH.

Bertram's Oil Polish Co..... Boston.

MOTORS, GENERATORS—ELECTRIC.

Fisher Electrical Works..... Detroit.
General Electric Co..... Schenectady, N. Y.
Sturtevant, B. F. Co..... Hyde Park, Mass.
Westinghouse Electric & Mfg. Co.....
Pittsburg, Pa.

Buyers' Directory of the Marine Trade.—Continued.

NAUTICAL INSTRUMENTS.

Ritchie, E. S., & Sons.....Brookline, Mass.

NAVAL ARCHITECTS.

Hynd, AlexanderCleveland.
 Kidd, JosephDuluth, Minn.
 Lovejoy, H. O.Buffalo.
 Matteson & Drake.....Philadelphia.
 Mosher, Chas. D.New York.
 Nacey, JamesCleveland.
 Rice, HenryBuffalo.
 Sadler, Perkins & Field.....New York.
 Steel, AdamCleveland.
 Wood, W. J.Chicago.

OAKUM.

DeGrauw, Aymar & Co.....New York.
 Stratford, Oakum Co.....Jersey City, N. J.

OIL ENGINES.

Mietz, Aug.New York.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph.....Jersey City, N. J.
 Standard Oil Co.....Cleveland.

PACKING.

Crane Co.Chicago.
 Jenkins Bros.New York.
 Katzenstein, L. & Co.....New York.
 New York Belting & Packing Co.....New York.

PACKING TOOL.

Matteson & DrakePhiladelphia.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
 Detroit Varnish Co.....Detroit.
 Detroit White Lead Works.....Detroit.
 Forest City Paint and Varnish Co.....Cleveland.
 New Jersey Zinc Co.....New York.
 Upson-Walton Co.....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co.....Buffalo.
 Chicago & Gt. Lakes Dredge & Dock Co.....Chicago.
 Dunbar & Sullivan Dredging Co.....Buffalo.
 Fitz-Simons & Connell Co.....Chicago.
 Hickler Bros.Sault Ste. Marie, Mich.
 Lake Superior Contracting & Dredging Co.....Duluth, Minn.
 Parker Bros. Co., Ltd.....Detroit.
 Smith Co., L. P. & J. A.....Cleveland.
 Starke Dredge & Dock Co., C. H.....Milwaukee.
 Sullivan, M.Detroit.

PIPE, WROUGHT IRON.

Bourne-Fuller Co.....Cleveland, O.
 Crane Co.....Chicago.
 Macbeth Iron Co.....Cleveland.

PLANING MILL MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co.....Cleveland, O.
 Otis Steel Co.....Cleveland.

PNEUMATIC TOOLS.

Allen, John F.....New York.

POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston.

PRESSURE REGULATORS.

Kieley & MuellerNew York.
 Ross Valve Co.....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
 Atlantic WorksEast Boston, Mass.
 Cramp, Wm. & Sons.....Philadelphia.
 Detroit Ship Building Co.....Detroit.
 Fore River Ship & Engine Co., Quincy, Mass.
 Great Lakes Engineering Works.....Detroit.
 Hyde Windlass Co.....Bath, Me.
 Jenks Ship Building Co.....Port Huron, Mich.
 Lockwood Mfg. Co.....East Boston, Mass.
 Macbeth Iron Co.....Cleveland.
 Milwaukee Dry Dock Co.....Milwaukee.
 Newport News Ship Building Co.....Newport News, Va.
 Phosphor Bronze Smelting Co., Ltd.....Philadelphia.

Roelker, H. B.New York.
 Sheriffs Mfg. Co.....Milwaukee.
 Superior Ship Building Co.....Superior, Wis.
 Thropp & Sons Co., J. E.....Trenton, N. J.
 Trout, H. G.Buffalo.
 United States Ship Building Co.....New York.

PROJECTORS, ELECTRIC.

General Electric Co.....Schenectady, N. Y.
 Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co.....New York.
 Great Lakes Engineering Works.....Detroit.
 Kingsford Foundry & Machine Works.....Oswego, N. Y.

PUNCHES, RIVETERS, SHEARS.

Allen, John F.....New York.

RANGES.

Russell & WatsonBuffalo.

REFRIGERATING APPARATUS.

Great Lakes Engineering Works.....Detroit.
 Roelker, H. B.New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes RegisterCleveland.
 Record of American & Foreign Shipping.....New York.

REPAIRS—ENGINE AND BOILER.

(See also Boiler Manufacturers and Engine Builders.)

Georgian Bay Engineering Works.....Midland, Ont.
 Gogebic Steam Boiler Works.....Duluth, Minn.
 Forest City Boiler Co.....Cleveland.
 Marine Iron Co.....Duluth, Minn.

RIVETING MACHINES.

Allen, John F.....New York.

RIVETS, STEEL FOR SHIPS AND BOILERS.

Bourne-Fuller Co.....Cleveland, O.

SAFETY VALVES.

American Steam Gauge & Valve Mfg. Co.....Boston.
 Ashton Valve Co.....Boston.
 Crane Co.....Chicago.
 Lunkenheimer Co.....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co.....Buffalo.
 Upson-Walton Co.....Cleveland.
 Wilson & SilsbyBoston.

SALVAGE COMPANIES.

See Wrecking Companies.

SEARCH LIGHTS.

General Electric Co.....Schenectady, N. Y.
 Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co.....Cleveland, O.
 Otis Steel Co.....Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
 Atlantic WorksEast Boston, Mass.
 Bertram Engine Works Co., Ltd.....Toronto, Can.
 Buffalo Dry Dock Co.....Buffalo.
 Cramp, Wm. & Sons.....Philadelphia.
 Craig Ship Building Co.....Toledo, O.
 Chicago Ship Building Co.....Chicago.
 Detroit Ship Building Co.....Detroit.
 Fore River Ship & Engine Co., Quincy, Mass.
 Great Lakes Engineering Works.....Detroit.
 Jenks Ship Building Co.....Port Huron, Mich.
 Lockwood Mfg. Co.....East Boston, Mass.
 Manitowoc Dry Dock Co.....Manitowoc, Wis.
 Milwaukee Dry Dock Co.....Milwaukee.
 Newport News Ship Building Co.....Newport News, Va.
 Roach's Ship YardChester, Pa.
 Shipowner's Dry Dock Co.....Chicago.
 Smith & Son, Abram.....Algonac, Mich.
 United States Ship Building Co.....New York.
 Willard, Chas. P. & Co.....Chicago.

SHIP CHANDLERS.

Baker, Howard H. & Co.....Buffalo.
 Marine Mfg. & Supply Co.....New York.
 Upson-Walton Co.....Cleveland.

SHIP LANTERNS AND LAMPS.

Russell & WatsonBuffalo.

SHIP TIMBER.

Martin-Barriss Co.....Cleveland.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co.....Jersey City, N. J.

STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Gilchrist & Co., C. P.Cleveland.
 Holmes, SamuelNew York.
 Lester, S. S.Quebec, Can.
 McCarthy, T. R.Montreal, Can.

STEAMSHIP LINES, PASS. AND FREIGHT.

American LineNew York.
 Anchor LineBuffalo.
 Boston Steamship Co.....Boston.
 Cleveland & Buffalo Transit Co.....Cleveland.
 Detroit & Cleveland Line.....Cleveland.
 Erie & Western Trans. Co.....Buffalo.
 Goodrich Trans. Co.....Chicago.
 International Mercantile Marine Co.....Philadelphia.
 Manitou Steamship Co.....Chicago.
 Mexican-American S. S. Co.....New Orleans, La.
 New York & Cuba Mail S. S. Co.....New York.
 Niagara, St. Catharines & Toronto Ry. & Nav. Co.....St. Catharines, Ont.
 Northern Michigan Trans. Co.....Chicago.
 Red Star LineNew York.
 Richelieu & Ontario Nav. Co.....Montreal, Can.
 United Fruit Co.....Boston.

STEEL CASTINGS.

Macbeth Iron Co.....Cleveland.
 Otis Steel Co.....Cleveland.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
 Chase Machine Co.....Cleveland.
 Dake Engine Co.....Grand Haven, Mich.
 Detroit Ship Building Co.....Detroit.
 Hyde Windlass Co.....Bath, Me.
 Jenks Ship Building Co.....Port Huron, Mich.
 Marine Mfg. & Supply Co.....Cleveland.
 Moulton Steering Engine Co.....New York.
 Pawling & Harnischteger.....Milwaukee.
 Sheriffs Mfg. Co.....Milwaukee.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J.....Boston.
 Schrader's Son, A.....New York.

SURVEYORS, MARINE.

Gaskin, EdwardBuffalo.
 Hynd, AlexanderCleveland.
 Lovejoy, H. O.Buffalo.
 Matteson & Drake.....Philadelphia.
 Parker Bros. Co., Ltd.....Detroit.
 Nacey, JamesCleveland.
 Rice, HenryBuffalo.
 Steel, AdamCleveland.
 Wood, W. J.Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co.....Chicago.
 Pittsburg Testing Laboratory, Ltd.....Pittsburg.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co.....New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F.....New York.
 Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
 Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co.....Kingston, Ont.
 Great Lakes Towing Co.....Cleveland.
 Midland Towing & Wrecking Co., Ltd.....Midland, Ont.

TRAPS, STEAM.

Kieley & MuellerNew York.
 Lunkenheimer Co.....Cincinnati.
 Sturtevant Co., B. F.,Hyde Park, Mass.

TRUCKS.

Boston & Lockport Block Co.....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co.....Pittsburg, Pa.

Buyers' Directory of the Marine Trade.—Continued.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge & Valve Mfg. Co. Boston.
Ashton Valve Co. Boston.
Crane Co. Chicago.
Jenkins Bros. New York.
Kieley & Mueller New York.
Lunkenheimer Co. Cincinnati.
Ross Valve Co. Troy, N. Y.

VALVES FOR WATER AND GAS.

Ross Valve Co. Troy, N. Y.

VARNISHES.

Detroit Varnish Co. Detroit.
Detroit White Lead Works. Detroit.
Forest City Paint & Varnish Co. Cleveland.
New Jersey Zinc Co. New York.
Also Ship Chandlers.

VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co. Hyde Park, Mass.

VESSEL AND FREIGHT AGENTS.

Boland, John J. Buffalo.
Brown & Co. Buffalo.
Elphicke, C. W. & Co. Chicago.
Fleming & Co., P. H. Chicago.
Gilchrist & Co., C. P. Cleveland.
Hall & Root Buffalo.
Helm & Co., D. T. Duluth.

VESSEL AND FREIGHT AGENTS—Con.

Hawgood & Co., W. A. Cleveland.
Holmes, Samuel New York.
Hutchinson & Co. Cleveland.
Lester, S. S. Quebec, Can.
McCarthy, T. R. Montreal.
Mitchell & Co. Cleveland.
Parker Bros. Co., Ltd. Detroit.
Prindville & Co. Chicago.
Richardson, W. C. Cleveland.
Sullivan, D. & Co. Chicago.

WATER GAUGES.

Bonner & Co., Wm. Boston.
Lunkenheimer Co. Cincinnati, O.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co. Buffalo.
DeGrauw, Aymar & Co. New York.
Upson-Walton Co. Cleveland.

WHISTLES, STEAM.

American Steam Gauge & Valve Mfg. Co. Boston.
Ashton Valve Co. Boston.
Lunkenheimer Co. Cincinnati.

WINDLASSES.

American Ship Windlass Co. Providence, R. I.
American Ship Building Co. Cleveland.
Hyde Windlass Co. Bath, Me.
Jenks Ship Building Co. Port Huron, Mich.
Marine Mfg. & Supply Co. New York.

WINCHES.

American Ship Windlass Co. Providence, R. I.
Georgian Bay Engineering Works. Midland, Ont.
Hyde Windlass Co. Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc. Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co. Kingston, Ont.
Great Lakes Towing Co. Cleveland.
Midland Towing & Wrecking Co., Ltd. Midland, Ont.
Parker Bros. Co., Ltd. Detroit.

YACHT AND BOAT BUILDERS.

Bertram Engine Works Co., Ltd. Toronto, Can.
Drein, Thos. & Son. Wilmington, Del.
Georgian Bay Engineering Works. Midland, Ont.
Truscott Boat Mfg. Co. St. Joseph, Mich.
Willard, Chas. P. & Co. Chicago.

YAWLS.

Drein, Thos. & Son. Wilmington, Del.

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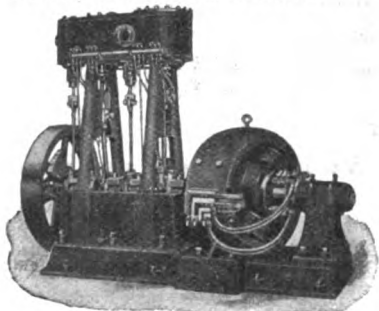
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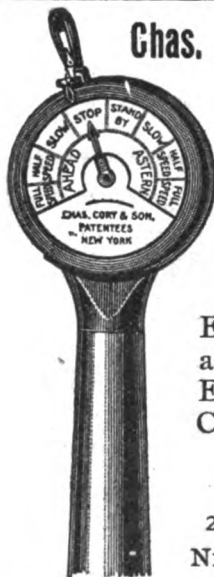
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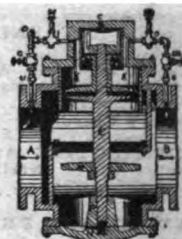
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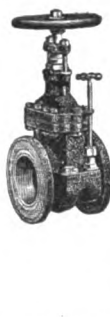
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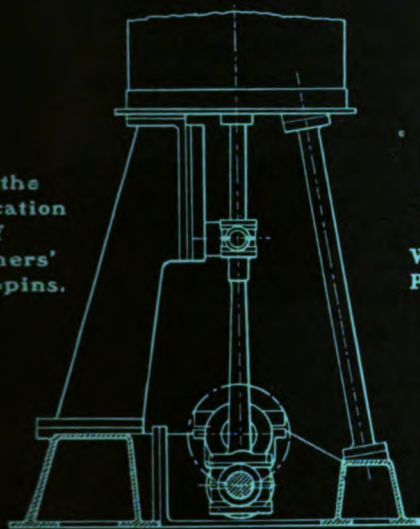
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No. 20, Chicago and Cleveland Exp.	*7:20 a.m.
No. 28, New York and Boston Exp.	*7:40 a.m.	*8:00 a.m.
No. 40, Toledo and Buffalo Accom. ..	†10:00 a.m.	†10:30 a.m.
No. 32, Fast Mail	*11:25 a.m.	*11:30 a.m.
No. 48, Accommodation via Sandusky ..	†1:40 p.m.	.....
No. 42, Boston-New York Express .....	.....	*11:45 a.m.
No. 44, Cleveland and New York Spl. ....	.....	*3:00 p.m.
No. 46, Southwestern Express .....	.....	*3:10 p.m.
No. 116, Ashtabula Accommodation. ....	.....	†4:30 p.m.
No. 6, Limited Fast Mail	*5:40 p.m.	*5:45 p.m.
No. 26, 20th Century Limited	*7:40 p.m.	*7:43 p.m.
No. 10, Chicago, N.Y. & Boston Spl.	*7:30 p.m.	*7:50 p.m.
No. 16, New England Express	*10:30 p.m.	*10:35 p.m.
No. 2, Day Express	†9:10 p.m.	†9:25 p.m.
No. 126, Norwalk Accommodation ..	†7:55 a.m.	.....
Westward	Arrive from East	Depart West
No. 7, Exposition Limited	*12:50 a.m.	.....
No. 11, Southwestern Limited	*2:55 a.m.	.....
No. 9, Day Express .....	.....	†6:10 a.m.
No. 15, Boston and Chicago Special.	*3:10 a.m.	*3:15 a.m.
No. 19, Lake Shore Limited	*7:15 a.m.	*7:25 a.m.
No. 23, Western Express	*10:30 a.m.	*10:35 a.m.
No. 29, Southwestern Special	†11:10 a.m.	.....
No. 33, Southwestern Express	*12:25 p.m.	.....
No. 133, Cleve and and Detroit Exp. ....	.....	*12:45 p.m.
No. 47, Accommodation	†11:00 a.m.	†3:00 p.m.
No. 141, Sandusky Accommodation. ....	.....	†3:10 p.m.
No. 43, Fast Mail	*4:35 p.m.	*4:40 p.m.
No. 127, Norwalk Accommodation	†5:10 p.m.
No. 37, Pacific Express	*6:50 p.m.	*7:20 p.m.
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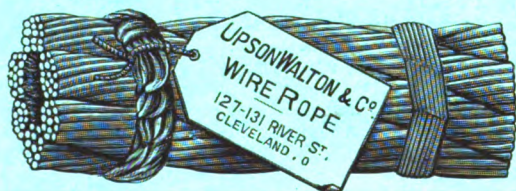
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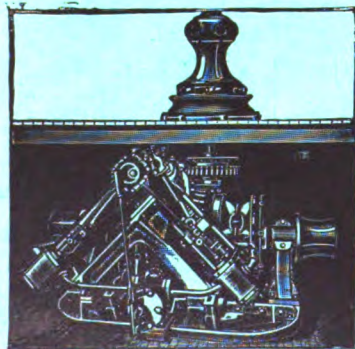
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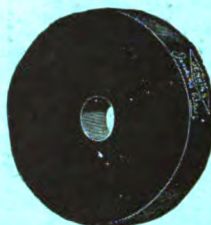
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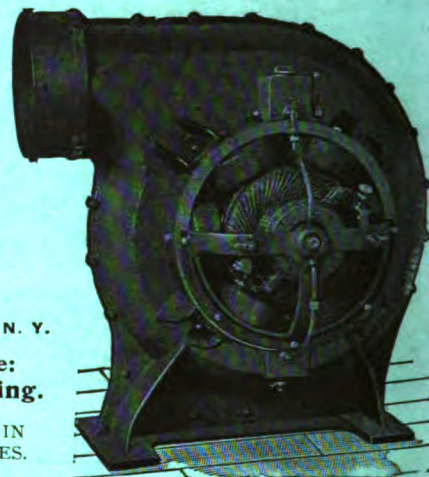
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